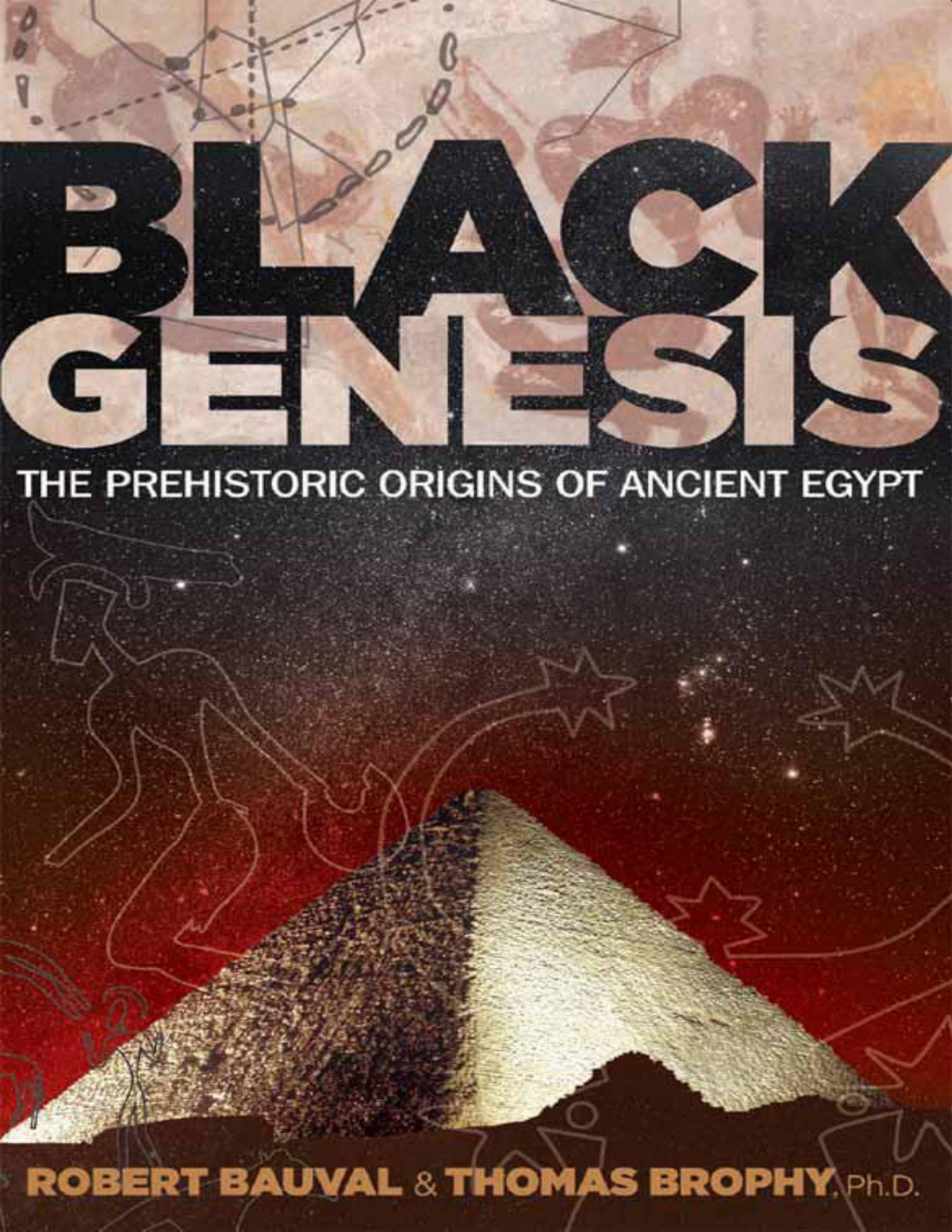
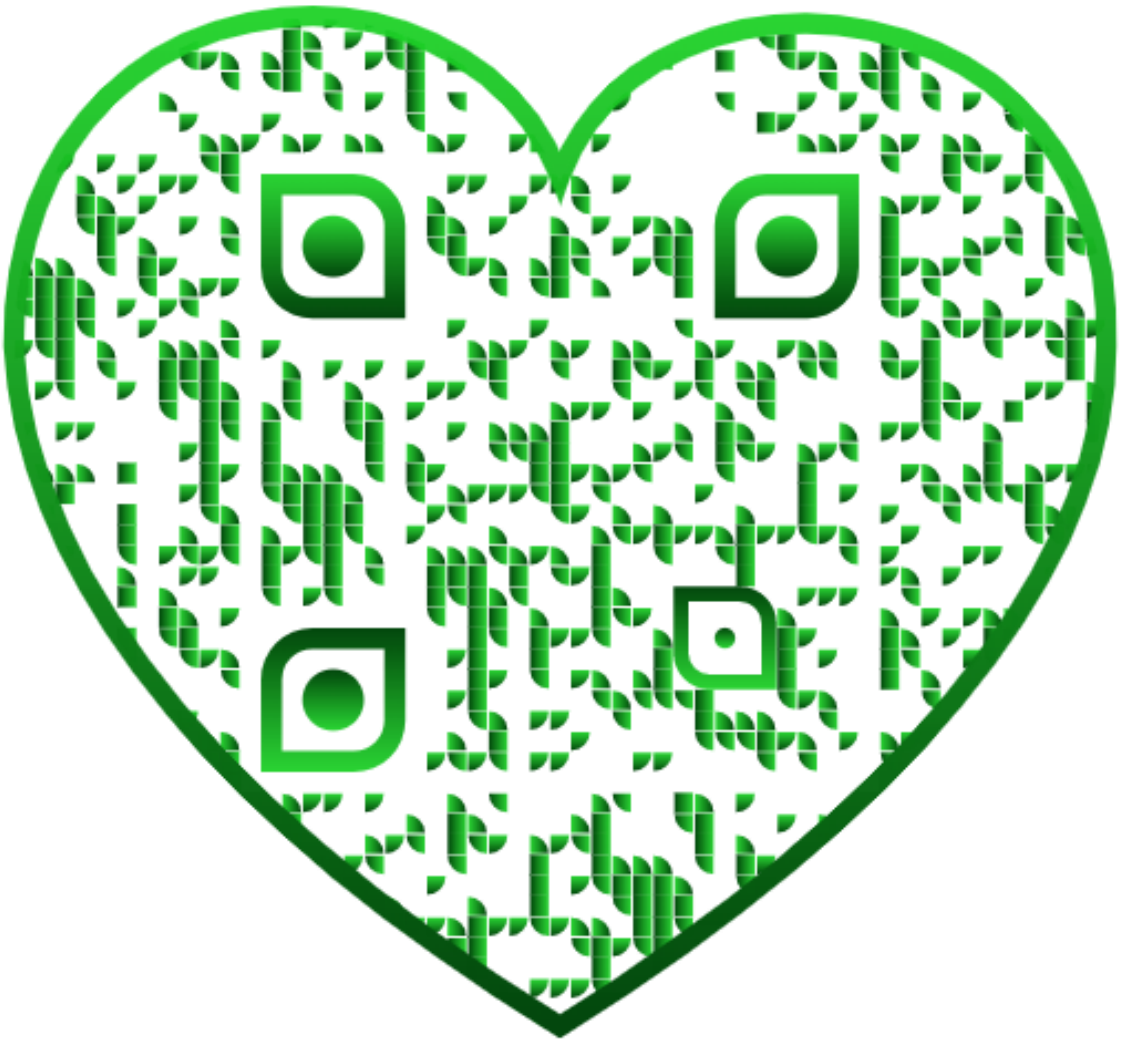
BLACK GENESIS

THE PREHISTORIC ORIGINS OF ANCIENT EGYPT



ROBERT BAUVAL & THOMAS BROPHY, Ph.D.



BLACK GENESIS

The Prehistoric Origins of Ancient Egypt

ROBERT BAUVAL and THOMAS BROPHY, Ph.D.

Bear & Company
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For my daughter, Candice, and my son, Jonathan. May you always remember your genesis.
—Robert Bauval

To my parents, in deepest gratitude for bringing me into this amazing journey.
—Thomas Brophy

BLACK GENESIS

"*Black Genesis* offers astounding new insights as Bauval and Brophy forcefully support, with hard data, the radical idea that Egyptian civilization was the outgrowth of a sophisticated Black African culture that existed thousands of years prior to the earliest known pharaohs. Their book is a must read for anyone interested in genuinely understanding the true origins of ancient Egypt and the dynamics of how civilizations develop."

ROBERT M. SCHOCH, PH.D., AUTHOR OF *VOYAGES OF THE PYRAMID BUILDERS* AND *PYRAMID QUEST*

"Readers of *Black Genesis* will never think of ancient Egypt in the same way again. Bauval and Brophy make the case that this venerable civilization was originated by Black Africans from the Sahara Desert and that the pyramids, the statues, and the hieroglyphs were the result of their knowledge and ingenuity. The authors trace the series of errors and misjudgments that have obscured the origins of this remarkable civilization. It is time for the record to be set straight, and *Black Genesis* is the book that may well do it. This is an authoritative, excellent, well-written book."

STANLEY KRIPPNER, PH.D., PROFESSOR OF PSYCHOLOGY AT SAYBROOK UNIVERSITY AND COAUTHOR OF *PERSONAL MYTHOLOGY*

"In *Black Genesis,* Bauval and Brophy combined their investigative skills to answer an obvious but often-neglected question, "Who *were* the ancient Egyptians?" With new astroarchaeological evidence they build a strong case for "The African origin of the pharaohs" and have dramatically altered our understanding of the past."

ANTHONY T. BROWDER, AUTHOR AND INDEPENDENT EGYPTOLOGIST

ACKNOWLEDGMENTS

This book was not an easy one to research and to put together due to the vast and complex issues involved as well as the need to organize and undertake deep desert expeditions to the Egyptian Sahara. Yet with perseverance, dedication, and enthusiasm, we plodded on, step-by-step, page-by-page, and we can now say that we are extremely proud and pleased with the result.

As always, our first thanks go to our respective families. Their support, love, and patience are greatly appreciated. We wish to pay special thanks and tribute to anthropologists Fred Wendorf and Romuald Schild of the Combined Prehistoric Expedition for opening the way to the study of Nabta Playa. We also thank astronomer Kim Malville for being the first to realize the importance of the megalithic alignments at Nabta Playa. Special thanks go to longtime colleague and friend Paul Rosen whose combination of scientific integrity and complete lack of bias or dogmatism has supplied immeasurably helpful collaboration. Thanks, too, to the Jet Propulsion Laboratory of Pasadena, California, for supporting the unusual project of further studies of Nabta Playa.

Our thanks and respect is also due to the desert explorers Mark Borda and Carlo Bergmann for their many discoveries in the Egyptian Sahara and for their kind efforts to share some of these with us. We also thank Mahmoud Marai for guiding us to the remote locations of Gilf Kebir and Jebel Uwainat and showing us the wonderful rock-art cave and the hieroglyphic inscriptions discovered at Uwainat in 2007. We extend thanks to our friend and desert guide Mahmoud (Tiger) Nemr and geologist and desert guide Diaa Shehata for taking us safely to Nabta Playa, and we thank our friend Michael Ackroyd for delivering us to Nabta Playa in 2003 with necessary permits and with great panache. We thank Chance Gardner and Vanesse McNiel for making the fine graphic animations of the Calendar Circle.

Our thanks also go to the many colleagues and friends who, directly or indirectly, have helped us put this book together: Linda and Max Bauval; Hoda and Camille Hakim-Taraboulsi; Sherif el Sebai of Tarot Travel Tours; Gouda Fayed; Angela Richards; Brian Hokum; Lyra Marble; Dustin Donaldson; John and Josette Orphanidis; Jean-Paul and Pauline Bauval; June and Jim Brophy; Geoffrey and Therese Gauci; Richard (Fuzzy) Fusniak; Ambassador Jean Paul Tarud-Kuborn and his lovely wife, Valentina Troni; William Horsman and Viviane Vayssieres; the lovely family of my late driver, Mahmoud El Kirsh; Arianna Mendo; Robert Schoch; John Anthony West; Lily Lee; the Helios family (you know who you are!); Khaled el Bary, owner of the wonderful Bary's Restaurant at the pyramids; Giulio Gallo; Mayumi Hashiyama; Carmen Boulter; and many others too numerous to name here, but who surely know that we are grateful for their friendship and support. We also thank our publisher, Inner Traditions, the lovely Cecilia Perugia at Corbaccio Edizione in Milan, and everyone at A. M. Heath Ltd. Last but definitely not least, we give thanks for having so many wonderful readers around the world who make all our efforts worthwhile.

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INTRODUCTION

ANCIENT EGYPT REBORN

No colors any more I want them to turn black . . .

MICK JAGGER AND KEITH RICHARDS, "PAINT IT BLACK," 1966

This book is the product of a deep and strong desire to use the best of our intellect, knowledge, and abilities to put right an issue that has long beleaguered historians and prehistorians alike: the vexed question of the Black African origins of the ancient Egyptian civilization. In spite of many clues that have been in place in the past few decades, which strongly favor a Black African origin for the pharaohs, many scholars and especially Egyptologists have either ignored them, confused them, or, worst of all, derided or scorned those who entertained them. It is not our business to know whether such an attitude is a form of academic racism or simply the blindered way of looking at evidence to which some modern Egyptology has become accustomed, but whatever the cause, this issue has remained largely unresolved.

We first came across this inherent bias and prejudice against African origins of the Egyptian civilization in the debate—more of an auto-dafé really—against the Black African professor Cheikh Anta Diop, who, in 1954, published his thesis *Nation Négre et Culture,* which argued a Black African origin for the Egyptian civilization. Anta Diop was both an eminent anthropologist and a highly respected physicist, and as such, he was armed with an arsenal of cutting-edge science as well as the use of the latest technology in radiocarbon dating and biochemistry to determine the skin color of ancient mummies and corpses by analyzing their content of melanin, a natural polymer that regulates pigmentation in humans. Yet in spite of his careful scientific approach, the Egyptian authorities refused to provide Anta Diop with skin samples of royal mummies, even though only minute quantities were required, and they pilloried and shunned him at a landmark symposium in Cairo in 1974 on the origins of ancient Egyptians. Diop died in 1986, his mission not fully accomplished. Fortunately, however, the debate on African origins was quickly taken up by Professor Martin Bernal, who, in 1987, published a three-volume opus, *Black Athena,* that flared even further the already-heated debate. Bernal, a professor emeritus of Near Eastern studies at Cornell University, was the grandson of the eminent Egyptologist Sir Alan Gardiner, yet this did not prevent Egyptologists from attacking him with even more vehemence than they had his Black African predecessor Anta Diop.

Even though there is still much controversy surrounding the origins of the ancient Egyptian civilization, we can now say with much evidence-driven conviction that its origins have their genesis with a Black African people who inhabited the Sahara thousands of years before the rise of the pharaonic civilization. In this book we present hard scientific evidence and cogent arguments that have been culled from the latest findings and discoveries made in the Egyptian Sahara during the past four decades. We have consulted the publications of eminent anthropologists, paleoanthropologists, paleoclimatologists, paleopathologists, genetic scientists, archaeologists, archaeoastronomers, geologists, and even reports from daring desert explorers such as Mark Borda, Carlo Bergmann, and Mahmoud Marai, who have all contributed to showing that this specific region of the world was the crucible of the ancient Egyptian civilization. In researching this book, we have used the best and latest research accredited to experts and scholars, and we have also provided extensive notes in order for the reader to trace this source material for further reading. In addition, we have specifically used our own tool kit and method, which entails the application of the science of astronomy to interpret the alignments of complex megalithic structures, pyramids, and temples, as well as extracting the astronomical content in ancient Egyptian texts and tomb drawings. To phrase it another way, we have coaxed the silent, ancient stones to reveal their secrets with the universal language of the sky.

Black Genesis is an intellectual time machine that takes you on a roller-coaster adventure into the beyond of recorded history. We have written it not for academic readership but for lay readers, those who wish to understand more regarding this debate on the origin of civilization and perhaps who wish even to be part of the restoration of Black Africa to its rightful place at the genesis of the human journey. Although, in this book specialized topics such as anthropology and precession astronomy are reviewed, we have kept the discussion as easy and as entertaining as possible in order to achieve a text that is user-friendly and well within the grasp of anyone who has a thirst for knowledge and a sense of adventure. Our wish is to interest a wider audience in this fascinating research and, we hope, to encourage participation in the debate. With Internet communication and the instantaneous distribution of data and information as well as the now

easy-to-use astronomy software accessible to all those with a home computer, the participation of the wider public in such debates has become a real and viable possibility, and, indeed, has quite often helped (*coerced* may be a better word!) experts to remove their blinders and look at the wider picture.

There is still much work to do in bringing to the world a new vision of the Black African origins of civilization. Yet if we buttress the theory with solid, current research and exploration, and if we look at the evidence with open minds free of prejudice and bias, progress of this notion of origins is gaining momentum. For many centuries the Black race of the world has either been exploited by its White counterpart or looked upon as inferior. Although many in the Western world have advanced a great deal in curbing such an attitude, the truth is that racial prejudice is still very much rampant in other parts of the world, and it lingers in uneducated or dark hearts in Europe and the New World. *Black Genesis* thus becomes not only a scientific thesis but also a testament of respect and admiration of all whose skin happens to be black and who have a direct ancestral line to Black Africa.

Our research has taken us from Europe and the United States to Egypt, from the comfort of five-star hotels in Cairo to camping in the remote Sahara, and from the studious environment of public libraries to chaotic journeys along the entire stretch of the Egyptian Nile Valley. We have consulted with experts on the prehistory of the Egyptian Sahara and traveled in four-wheel-drive vehicles with intrepid explorers along large swaths of no-man's-land in southwestern Egypt. We have seen the dense, multiracial populations of large Egyptian cities as well as the sparsely inhabited oases of the Western Desert (Egyptian Sahara). In downtown Cairo we have heard the cacophony of traffic, whose din reaches the brooding pyramids of Giza and the great temples of Luxor and Karnak, and we have experienced the deafening silence of Gilf Kebir and Jebel Uwainat. We have done all this because we believe in our cause and in our work and because we love the excitement and thrill of the chase and the challenge of the enterprise. Most of all, we have done all this because a huge intellectual dam has been breached, and we want to be part of the flood that will regenerate Egypt with a new and purer vision of itself.

1

STRANGE STONES

In Nabta there are six megalithic alignments extending across the sediments of the playa. . . . Like the spokes on a wheel, each alignment radiates outwards from a complex structure. . . .

DR. MOSALAM SHALTOUT, NATIONAL RESEARCH INSTITUTE OF ASTRONOMY AND GEOPHYSICS, EGYPT

[One of the] alignments points to the rising position of Sirius . . . the primary calibrator of the Egyptian calendar. . . .

DR. FRED WENDORF AND DR. ROMUALD SCHILD, *THE MEGALITHS OF NABTA PLAYA*

A LUCKY TURN OF THE SPADE

The phrase *a lucky turn of the spade* is well known in archaeology. It reminds us that many of the great discoveries have often been made not by intellectual ingenuity, as we would expect, but by pure chance. Moreover, it implies that the credit does not necessarily always go to the person who actually held the spade, but rather to his employer, the leader or financier of the archaeological project. For example, when, in 1873, a Turkish worker plunged his rusty spade into the soil and discovered the legendary city of Troy, this was a lucky turn of the spade—not for him—but rather for the German adventurer Heinrich Schliemann. When, in 1922, an Egyptian peasant shifted the sand with his spade and discovered the entrance to Tutankhamun's tomb, this too was a lucky turn of the spade not for him but for the English archaeologist Howard Carter. Schliemann and Carter became legends in their own time; the workers were given a small stipend and then departed into oblivion.

So when an unnamed student from Southern Methodist University of Texas (SMU) discovered Nabta Playa, his or her name was somehow lost and forgotten in the academic verbiage that followed. Admittedly, this time there was no lucky turn of the spade. In fact, there was no spade in the hand of the unnamed student. The leader of the expedition, Fred Wendorf, and the student as well as a few others with them had by chance stopped their Jeep in order to have a comfort break—a pee—after a long and tiring drive in the Egyptian Sahara. They were 100 kilometers (about 62 miles) due west of Abu Simbel in a nondescript, empty desert spot. During their rest, as they looked down around their feet, they slowly realized they were standing in a field of numerous artifacts, the remnants of finely made stone tools and potsherds. Those artifacts alone were intriguing enough to prompt Fred Wendorf to investigate further and begin an entirely new excavation site. What the explorers did not then realize was that the strange clusters of large stones all around them, half-buried in the sand, would eventually shock the world's concept of antiquity. At first the members of the expedition assumed that these stones were just natural boulders sticking out of the ancient sediment—a common feature in this arid part of the world. In fact, for years, as they excavated in the midst of the boulders, searching for and finding the expected Neolithic artifacts, they assumed the large stones were natural bedrock outcrops. As they looked closer, however, it dawned on them that the stones were positioned in unnatural formations—strange geometrical clusters, ovals, circles, and straight lines—and they were sitting on the sediments of an ancient dry lake. Someone had taken the trouble to move these stones at great effort. Who had done this? When? More intriguingly, why? It would be no exaggeration to say from the outset of our story that Wendorf's findings and those of his team, which were published gradually from the mid-1970s until very recently, should have shaken to its very core the scholarly world and should have changed its perception of Egyptian history and even, perhaps, of civilization as a whole. This, however, didn't happen. Nabta Playa and its mysteries remained an undefused intellectual bomb, ticking away, remaining unexploded in the hallways of established knowledge.

Until now.

THE COMBINED PREHISTORIC EXPEDITION (CPE)

Fred Wendorf's fascination with the Egyptian Sahara started way back in 1960, when, in a desperate bid to save Egypt's ravaged economy, the Egyptian government decided to build a huge dam on the Nile just south of Aswan, 900 kilometers (about 600 miles) from Cairo. Egypt's population had burgeoned from a comfortable ten million at the turn of the nineteenth century to an unsustainable fifty million by 1960, and the country was now in dire need of cheap energy to service the ever-growing masses and sprouting agricultural and industrial projects. There were also new infrastructure projects planned for the delta region and all along the 1,000-kilometer (about 621 miles) Nile Valley—roads, pipelines, sewage plants, airports, hospitals, and schools—which President Gamal Abdel Nasser had promised the people after the so-called Free Officers Revolution of 1952. Unable to obtain funds for all this from the Western powers because of ongoing anti-Semitism in Egypt and the country's hostilities with Israel, Nasser was forced to seek help from communist Russia, which was eager to introduce socialism to Egypt and to gain a foothold in the Arab world. For infrastructure projects Egypt provided cheap labor from its huge unemployed masses, while Russia provided the cash and the technology—and even threw a few Mig jet fighters and tanks into the deal.

When finished, the dam on the Nile was to form a giant lake, Lake Nasser, which not only would flood much of the inhabited Nile Valley upstream but also would submerge many ancient temples, among them the great temple of Ramses II at Abu Simbel and the beautiful temple of Isis on the Island of Philae. The archaeological world communities were outraged. Not as well publicized at the time, but also slated to be lost were several prehistoric sites in the adjacent desert earmarked for new farming projects. At the eleventh hour, however, UNESCO World Heritage sounded the alarm, and funds were quickly raised from big donors across the world. A huge international rescue operation hastily worked to save the ancient temples. The effort involved experts and engineering contractors from Europe and the United States.

Yet while this sensational salvage operation grabbed all the headlines, another, more modest, operation went relatively unnoticed. This was the scantily funded rescue mission started in 1962 and headed by Fred Wendorf, who was then curator of the Museum of New Mexico. Fred Wendorf had set himself the daunting task of salvaging or, at the very least, documenting in detail the prehistoric sites in the Egyptian Sahara before they were lost forever. Wendorf 's rescue operation was at first funded by the National Science Foundation of America and the U.S. State Department and was made up of an informal team of anthropologists, archaeologists, and other scientists who were given the collective name of Combined Prehistoric Expedition, or CPE. Three institutions formed the core body of the CPE: SMU, the Polish Academy of Sciences (PAS), and the Geological Survey of Egypt (GSE). In view of his credentials and seniority, Wendorf remained in charge of the CPE. In 1964 Wendorf resigned from his post at the Museum of New Mexico and joined Southern Methodist University (SMU) as head of the anthropological department—a move that allowed him to devote more time to the ongoing research in the Egyptian Sahara. In 1972, however, Wendorf handed the day-to-day operations to a Polish anthropologist, Dr. Romuald Schild. At this point, both Wendorf and Schild admitted, "Only a few signs suggested that a new archaeological dreamland is there buried in the sands and clays."[1] Barely a year later, however, in 1973, after Wendorf 's fateful pee break 100 kilometers from Abu Simbel, and after they walked around the large, shallow basin and saw all the strange stone clusters and protracted alignments as well as a plethora of tumuli and potsherds strewn all over the ground, both men started to suspect that just maybe they had hit the anthropological jackpot—for this was no ordinary prehistoric site. It was a sort of unique Stone Age theme park in which mysterious events and occult ceremonies quite obviously took place. The local modern Bedouins called the region Nabta, which apparently meant "seeds." Borrowing this name and concluding that the wide, sandy-clay basin they stood on in the desert was the bottom of a very ancient lake, Wendorf and Schild christened the site Nabta Playa.

But what exactly is Nabta Playa, and what are the mysteries it conceals?

CIRCLE, ALIGNMENTS, AND TUMULI

The Egyptian Sahara—which is also known as the Eastern Sahara or Western Desert—is a vast, rectangular region that is bracketed on its four sides by the Mediterranean Sea in the north, the Nile Valley in the east, Libya in the west, and Sudan in the south. It is almost the size of France, and, apart from the five main fertile oases that run in a line from north to south, it is considered the most arid and desolate place in the world, especially the corner in the southwest, adjacent to Sudan and Libya. Because of this terrible aridity and also because some parts of it are so remote, the Egyptian Sahara remains largely unexplored. True, some archaeological research has taken place in and around the five major oases, but few, if any, explorations have been carried out in the deep desert or in that distant southwestern corner. This is especially the case for the two highland regions known as Gilf Kebir and Jebel Uwainat. These are composed of giant, rocky massifs that act as a natural barrier to Egypt's southwest frontier corner with Sudan and Libya. These almost surreal "Alps of the

desert" emerge from the surrounding flat landscape like giant icebergs in a still ocean, and in daytime they loom in the haze like eerie mirages that can taunt, daunt, and terrify the most intrepid or placid of travelers.

As odd as it may seem, especially given our perspective of today's amazing technological advances in communication, no one in modern times knew of the existence of Gilf Kebir or Jebel Uwainat until the early 1920s—or so it seemed, as we will see in chapter 2. The abnormally belated discovery of Gilf Kebir and Jebel Uwainat coupled with their remoteness and the harsh and extremely inhospitable climate of the region are the main reasons for the almost nonexistent archaeological exploration there. In addition, there has been a strange disinterest by Egyptologists who have insisted that it was impossible for the ancient Egyptians of the Nile Valley to have reached these faraway places through vast distances of open and waterless desert. Nonetheless, this belief is somewhat odd, because it has been known since 1923 that Gilf Kebir and Jebel Uwainat were once inhabited by a prehistoric people who left evidence of their presence there in an abundance of rock art on ledges and in caves and in the many *wadis* (valleys) skirting the massifs. Perhaps the greatest mystery of these strange places was that, in spite of the plentiful rock art and stone artifacts that attest to human presence, no actual human remains or even empty tombs have so far been found there. This was also the case at Nabta Playa.

The question surely begs asking: Were Gilf Kebir, Jebel Uwainat, and Nabta Playa not places of permanent habitation but outposts for people who moved from place to place and who had their home base elsewhere? For example, could the people of Nabta Playa, with their mysterious megalithic legacy, be the same people of Gilf Kebir and Jebel Uwainat, with their puzzling rock art legacy? If so, then how could such people traveling on foot—or, at best, on donkey—across such vast distances (there are 580 kilometers—about 360 miles—between Nabta Playa and the Gilf Kebir–Jebel Uwainat regions) in this totally waterless desert?

Before we attempt to answer such questions, we must look at an interesting and possibly very relevant geographical fact: Nabta Playa and the Gilf Kebir–Jebel Uwainat area are almost on the same east–west line that runs just north of latitude 22.5 degrees north, forming a sort of natural highway between the Nile Valley, Nabta Playa, and, at its western end, Gilf Kebir and Jebel Uwainat. From a directional viewpoint, then, ancient travelers would easily have known how to journey to such distant locations simply by moving due east or due west—a direction that can be determined by the sun's shadow. Knowing, however, in which direction to move is one thing; making the long journey to an end point is quite another. Such a long stretch of desert crossing is impossible on foot or on a donkey unless there are watering holes or wells along the way. Yet there are no wells or surface water in this stretch of desert between Nabta Playa and Gilf Kebir, only bone-dry sand, dust, and rocks. Nothing can survive in this wasteland without adequate sources of water. Indeed, that Jebel Uwainat and Gilf Kebir were discovered so late shows how problematic it is to reach these regions without motorized four-wheel-drive vehicles that are fully equipped for rough terrain.

Because of this, as well as the hazards involved in such deep desert trekking, only a handful of people have ventured into this wilderness. The region is still a no-man's-land for tourists, and very few, if any, Bedouins who roam the Egyptian Sahara go there. In fact, so uninterested were Egyptologists in these remote areas that the places were—and still are—hardly mentioned in any but the rarest of Egyptological textbooks. Oddly enough, in 1996 it was left to Hollywood to generate some interest in Gilf Kebir and Jebel Uwainat through the academy-awardwinning film *The English Patient* in which the hero supposedly crashes his single-engine plane on the western side of Gilf Kebir. Yet even then the scenes in the movie were shot not on location but in the more accessible desert of Morocco.[*1] At any rate, whatever the reason, Gilf Kebir and Jebel Uwainat were not included in the Combined Prehistoric Expedition mandate. The CPE must have assumed, as most Egyptologists did in those days, that no one could have traveled such vast distances in the arid desert in ancient times, and, therefore, there could not be a direct connection between the prehistoric people of Gilf Kebir and Jebel Uwainat and the people who built and occupied Nabta Playa. We will return to this important misjudgment in the next chapter.

In the later twentieth century another misjudgment occurred: although from 1973 to 1994 the site of Nabta Playa was the intense focus of anthropological and archaeological investigations by the CPE, it nonetheless failed to take notice of the very obvious megalithic alignments there, and it certainly did not have them checked by an astronomer. This was a rather curious oversight that even Fred Wendorf himself had trouble explaining: "The megaliths of Nabta were not recognized or identified for a long time. We began to realize their significance only in 1992. . . ."[2] and "it is not clear why we failed to recognize them previously, or rather why we failed to understand their significance during the first three field seasons 1974, 1975, and 1977 at Nabta. It was not that we did not see them because we did, but they were either regarded as bedrock or, in some instances where it was clear they were not bedrock, regarded as insignificant."[3]

As the author John Anthony West once remarked, archaeologists can have blindered views and miss the obvious: "[I]f you are bent on looking only for potatoes in a field of diamonds, you will miss seeing the diamonds!"[4] To be fair to the CPE, though, the anthropo logical and archaeological evidence so far was in itself exciting stuff. Carbon-14 dating resulted in dates as far back as 7000 BCE and as recent as 3400 BCE, showing an on-and-off presence at Nabta Playa over an incredible span of years: more than three and a half millennia. The evidence at Nabta Playa also showed that at first, people came seasonally, when the lake was filled by the monsoon summer rains, arriving probably in July and staying until January, when the lake dried up again. Eventually, sometime around 6500 BCE, they figured out how to stay at Nabta Playa permanently by digging deep wells. Around 3300 BCE, however, the changes in climate made the region extremely arid, and Nabta Playa had to be abandoned. The mysterious people simply vanished, leaving behind their ceremonial complex that the CPE had discovered more than five millennia later. Its members were now at odds to understand the function and meaning of the complex.

First the CPE was baffled by the dozen or so oval-shaped tumuli at the north side of Nabta Playa. These looked like flattened igloos made of rock debris and covered with flat slabs of stones. More baffling still was when one of these tumuli was excavated by the CPE. It was found to contain the complete skeletal remains of a young cow, and other tumuli also contained scattered bones of cattle. Wendorf christened the area "the wadi of sacrifices" and concluded that these cattle burials and offerings appear to indicate the presence of a cattle cult. Radiocarbon dating placed these cow burials at around 5500 BCE, thus at least two thousand years before the emergence of the well-known cattle cults of ancient Egypt, such as those of the cow-faced goddess Hathor, the universally known goddess Isis, and the sky goddess Nut.[5]

There were also strange clusters of large stones at the western part of Nabta Playa—about thirty of them, which the CPE called complex structures. When some of these were excavated the CPE found, to its great astonishment, that these structures had been deliberately placed over natural rock outcrops that were 3 to 5 meters (about 10 to 16 feet) below the surface of the earth. Furthermore, it seemed that these strange rock outcrops had actually been smoothed to "mushroom-like" shapes by human hands! The largest of these so-called complex structures was named Complex Structure A (CSA). When excavated it was found to contain, at a depth of 3 meters, a large, rough stone sculpture carved to look something like a cow and placed above the sculpted rock outcrop. Moreover, emanating from Complex Structure A were a series of stone alignments that shot out like spokes from a bicycle wheel for several hundred meters, with some projecting toward the north and others toward the east.

Figure 1.1. Prehistoric palette found at Gerzeh, ca. 4000–3000 BCE, thought to represent the goddess Hathor.

There was more, however. The now-famous part of Nabta Playa, its pièce de résistance, was a small stone circle at the northwest part of the site, which looked a bit like a mini Stonehenge. The standing stones—twenty-nine of them—that formed the circle contained four gates, which created lines of sight that ran east–west and north–south. Placed in the center of the circle were two rows of three upright stones each (six stones in total), which gave the whole arrangement the appearance of the dial of a giant clock. Some of the stones had clearly been displaced, perhaps by vandals, and so the CPE invited a young and gifted anthropologist from the University of Arizona, Dr. Nieves Zedeño, to help them reconstruct the circle to its original form of millennia ago. Clearly this was no ordinary prehistoric structure. At this

stage the CPE anthropologists were completely baffled as to what purpose it might have served. Wendorf and Schild were now beginning to suspect that the whole of Nabta Playa might have less to do with anthropology and more to do with astronomy. So, in 1997, they finally sought the help of an astronomer from the University of Colorado in Boulder, Dr. Kim Malville, who was known for his specialized studies on the astronomy of prehistoric sites. They were in for a big surprise.

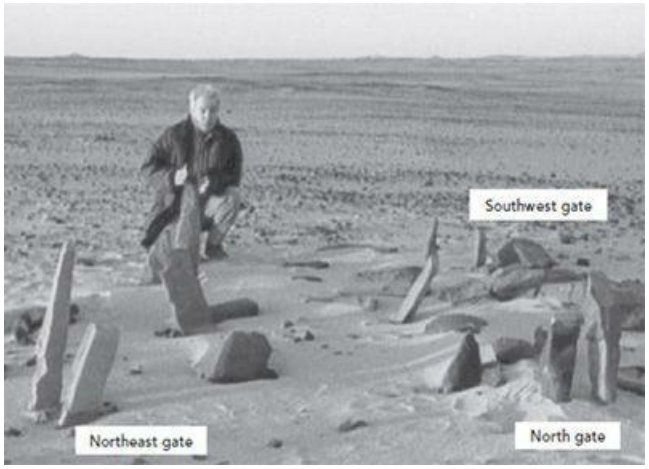


Figure 1.2. Schild with Calendar Circle, Nabta Playa, winter 1999

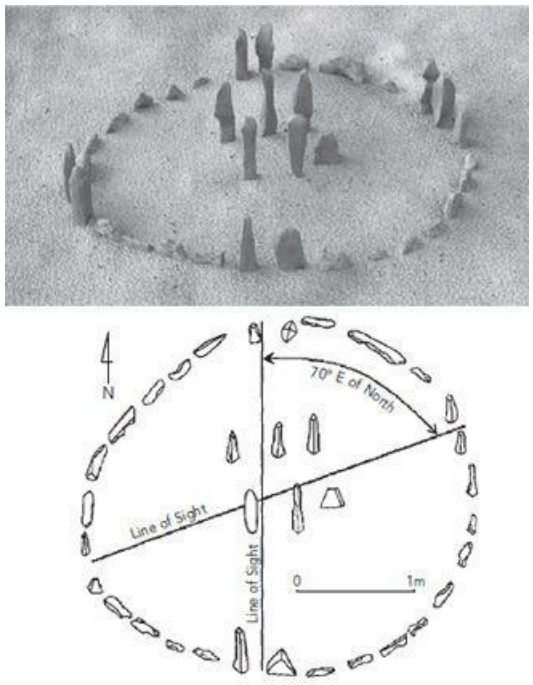


Figure 1.3. Artist's graphic depiction of the Calendar Circle, based on the archaelogical reconstruction map of Applegate and Zedeño. Graphics by Doug Thompson for Carmen Boulter.

Reconstructing the Calendar Circle

There has been a certain amount of controversy as to what exactly happened during and after the reconstruction of the circle (called the Calendar Circle) at Nabta Playa. In June 2008 the authors contacted Dr. Zedeño and asked her if, because there appeared to have been much tampering with the Calendar Circle (especially in 2007–2008), she might help work out what happened from the time the circle was discovered (in 1974) to the publication of Malville's article in *Nature* in 1998. it was noted to Dr. Zedeño that in February 2008 the Calendar Circle was removed from its original place at Nabta Playa and transported to the Nubian Museum in Aswan.

Dr. Zedeño replied in a personal corresponence to Robert Bauval: "I mapped the calendar in the winter of 1991–1992. I never saw it again, or before that date for that matter, so I don't know what happened to it. No idea what the cow

stone is or where it was before it was removed. Some photos do not seem to be of the same site, in fact there seems to be a fake calendar photo here and there. . . . The only authoritative publication about the calendar I know of is a chapter in Wendorf, Schild, and associates. . . .” As Dr. Zedeño indicates, she mapped the circle in 1991 and 1992, whereas Schild said he made the first map in 1992. Also, Zedeño suggests that the only authoritative paper she knows is a chapter in the publication of Wendorf et al., which is in fact an article by Zedeño herself and a colleague, Alex Applegate, published in 2001. She ignores the 1998 publication in *Nature* by Wendorf and Malville. We are not sure what “fake calendar” she refers to. Furthermore, Zedeño says she never saw the Calendar Circle before 1991 or after 1992 and therefore does not know what happened to it. yet in her 2001 article coauthored with Applegate, she writes: “However, one should note that since the time of the site’s original discovery [1973], only eight of the presumed fourteen upright slabs remain in place, while the other six center slabs have fallen. In addition, the presumed outer ring suffered an even greater displacement with one of the stones deposited over 7 meters [about 23 feet] from its postulated position.”[6] To confuse things even further, in an e-mail message we received from Romuald Schild on June 12, 2008, “The first field map of the calendar was made by dr. Zedeño and Schild in February 1992, while the first hypothetical reconstruction of the devise, including directions and angles of the sights (gates), was drawn by myself, also in February 1992.”

IN COMES ARCHAEOASTRONOMY

In the past forty years or so there has been a growing interest in the new scientific field of archaeoastronomy, which, according to one school of thought, is defined as the study of the astronomies, astrologies, and cosmologies, as well as the alignments of monuments and buildings of ancient cultures. This scientific discipline has emerged as a new tool for archaeology, because it has become more apparent in recent years that the cyclical motions of the stars, sun, moon, and planets were very much an integral part of the religious ideologies of ancient cultures and that ancient peoples applied such ideas to the design and alignment of their monuments. It is thus imperative to bring in the science of naked-eye observational astronomy as a necessary instrument in order to understand fully the meaning of the design, alignments, and sometimes the choice of location of ancient temples, pyramids, and even whole cities. For example, according to E. C. Krupp:

> The cosmos itself is what mattered to our ancestors. Their lives, their beliefs, their destinies—all were part of this bigger pageant. Just as the environment of their temples was made sacred by metaphors of cosmic order, entire cities and great ritual centres were also astronomically aligned and organised. Each sacred capital restated the theme of cosmic order in terms of its builders’ own perception of the universe. Principles, which the society considered its own—which ordered its life and gave it its character—were borrowed from the sky and built into the plans of the cities.[7]

A sort of stillborn precursor of modern archaeoastronomy can be found in the turbulent intellectual milieu that swirled through the French intelligentsia at the turn of the nineteenth century after Napoleon, in 1799, took a cadre of top scientists and scholars along with his army on their adventurous military campaigns through Egypt. Napoleon also took along artists to record the journeys in sketches. One such artist, Vivant Denon, was fascinated by a zodiac sculpted onto the ceiling of a temple at Dendera. In Paris, Denon published as a book his sketch of the Dendera zodiac along with an account of his travels, and it became a huge bestseller in both France and England. In the important scientific and scholarly societies of Paris there arose a protracted and very active debate focusing on attempts to date the Dendera zodiac. One camp was composed of scientific luminaries of the time, many of whose names are familiar to any student of science today. These scientists often gathered at the home of the Marquis de LaPlace. Particularly active in the Dendera zodiac debate were physicists Jean-Baptiste Biot and Joseph Fourier, astronomer Johan Karl Burckhardt, and his engineer partner Jean-Baptiste Coraboeuf. The approach that all in this camp followed in order to attempt to date the zodiac was to match calculations of the astronomical precession of the equinoxes with the images of constellations on the Dendera zodiac. They followed the reasoning of pre–French Revolutionary scholar Charles Dupuis, who had based his study of the origins of religion on interpreting religious mythologies in astronomical terms. As California Institute of Technology historian of science Jed Z. Buchald puts it,

> Dupuis had located the birthplace of the zodiac in an Egypt older by far than any chronology based on textual

arguments—and especially on the Books of Moses—could possibly allow. (Standard biblical chronology placed the origin of all things at about 4000 BC. . . .) According to Dupuis, the zodiac, and astronomy itself, was born near the Nile over 14,000 years ago. The Greeks, he insisted, were scientific children compared to the Egyptians, whose knowledge and wisdom underlay all of Western science and mathematics.[8]

The scientists competed fiercely, often disagreeing with each other. For example, Biot seems to have enjoyed pointing out that Fourier, famous for his mathematics, had miscalculated the heliacal rising of Sirius. Yet they all used precession calculations to date the Dendera zodiac. One thing that hampered them and that is still uncertain today was that it is not clear how much of the Dendera zodiac is representative of actual events in the sky and how much of it is merely symbolic horoscope. This gets at the heart of the other camp in the zodiac-dating debates of the time: the philologists and linguists who argued that astrophysical calculations should not be applied, because all ancient symbology is best understood as an expression of the cultural lives of the ancients, not as a representation of the physical world.

Stirring even more the turbulence of the debate was that many French intellectuals, such as Dupuis, had little use for biblical fundamentalism, while others believed all scholarship should be firmly based on interpreting biblical Mosaic (emphasizing the Books of Moses) chronology. One of these was the young Jean-Francois Champollion.

Meanwhile, a French antiquities collector named Saulnier had dispatched a master stonemason named Lelorrain on an expedition to Dendera to steal the zodiac. After using stone saws and chisels and finally dynamite, Lelorrain managed to cart the remains of the temple ceiling back to Paris. These remains, however, did not include the parts of the ceiling that ended up winning the Dendera zodiac debates. In September 1822, Champollion, after years of poverty-stricken excruciating efforts,[9] finally cracked the code for how to decipher hieroglyphs. Champollion first deciphered the cartouches that contain royal names. (A cartouche is an oval enclosure in which the name of a pharaoh is inscribed. Only a king's name can be written within a cartouche.) Among the first cartouches he deciphered were those next to the Dendera zodiac. There he read the ancient Greek word for "ruler," thus dating the construction of the zodiac ceiling to the Ptolemaic period and winning the debate for the side of the philologists, who could happily boot the physicists and astronomers out of the circle of those considered able to offer legitimate authority about antiquity.

Yet in what must be one of the great ironies of history, in 1828, when Champollion had the resources finally to mount his own expedition and he arrived at Dendera to see his famous cartouches, he was horrified to find them empty. They never had contained any hieroglyphs, no royal names at all. It seems the artists with Napoleon's army, who were often quite accurate in their depictions, in this case had been puzzled by the strange, empty cartouches and had sketched something in them simply for artistic reasons. By the time of Champollion's trip, however, the philologists had consolidated their authoritative hold on antiquities studies enough to keep the physical scientists at bay for some time. Further, as it turned out, Champollion's date was not far off anyway.[*2]

Eventually, we would have a new mode of historical understanding stemming from neither the extreme philologist-linguist camp nor the extreme physicist-astronomer camp, but a synthetic approach including many forms of evidence—archaeological, artistic, linguistic, and astronomical—that would come into play.

Because he began to employ such a synthetic approach, the father of archaeoastronomy may legitimately be the British astronomer Sir Norman Lockyer. Lockyer was born in 1836 in Rugby, England. As a young man, he had worked for the War Office in London, and it was there that he first developed a keen interest in astronomy. In 1862 Lockyer was made a fellow at the Royal Astronomical Society, and, in 1868, while working at the College of Chemistry in London, he made his first major contribution to science by showing that the bright emissions from the sun during a total eclipse were caused by an unknown element he named "helium"—twenty-seven years before Sir William Ramsay would isolate this gas in the laboratory! In 1869 Lockyer made another important contribution to science: he founded the journal *Nature,* which was to become the most influential scientific periodical in the world. Further, in 1885 Lockyer became the world's first professor of astronomical physics. For his many discoveries and achievements, Lockyer was knighted in 1897.

At the age of fifty-three, toward the end of his academic career, Lockyer indulged in his greatest passion: the study of the astronomies of ancient cultures and the alignments of their temples. He realized that archaeologists had not "paid any heed to the possible astronomical ideas of the temple builders"[10] and, furthermore, that "there was little doubt that astronomical consideration had a great deal to do with the direction towards which these temples faced."[11] He had read of the magnificent pyramids and temples of ancient Egypt, and so, in November 1890, Lockyer went there to see them for

himself. In Cairo he was assisted by the German Egyptologist Heinrich Brugsch, an authority on astronomical inscriptions and drawings found in temples and tombs of pharaohs and noblemen. During a meeting with Lockyer, Brugsch explained that the rituals and ceremonies of ancient Egyptians clearly contained astronomical connotations. Encouraged by this, Lockyer sailed to Luxor. There he studied the alignment and symbolism of several temples, including the great temple of Amun-Ra at Karnak. Back in England, Lockyer published his findings in *The Dawn of Astronomy.* It was the first book of its kind, and, taking into account the incomplete and rudimentary knowledge of Egyptologists at that time, Lockyer's work is a remarkable achievement that brought to attention the importance of applying astronomy to the studies of ancient cultures. Yet even though Lockyer's approach was highly scientific and his arguments sound, nearly all Egyptologists either ignored or rudely derided his thesis. Like Galileo before him, who calmly told his inquisitors "but it [Earth] does move . . ." (*e pur si muove*), poor Lockyer told the Egyptologists "of all the large temples I examined there was an astronomical basis . . ."[12] His words fell on deaf ears. In the years that followed, the Egyptologists took refuge in their belief that by having silenced Lockyer and having thrown him off their turf, they had shaken off all those pseudoscientists, dilettantes, and hangers-on who dared to oppose their views. For a while it did seem that they had succeeded.

In 1963, however, another archaeoastronomer came to haunt them again with a vengeance: the American professor Gerald Hawkins of the Harvard-Smithsonian Observatories in Cambridge, Massachusetts. Hawkins infuriated archaeologists by publishing in Lockyer's now highly influential academic journal *Nature* a series of articles on the vexed topic of the alleged astronomy of Stonehenge, and he followed the articles with the publication of his now-renowned book *Stonehenge Decoded.* Hawkins went much further than Lockyer: he claimed that the alignments at Stonehenge were definitely astronomical and had been deliberately aimed at the sun and moon *azimuths* (positions at rising and setting). He also asserted that the fifty-six holes of the so-called Aubrey Circle were representative of the fifty-six years of the moon's full eclipse cycle of three nodal revolutions of 18.61 years each. The implications were huge. This interpretation meant that the ancient builders of Stonehenge, far from being primitives and illiterate barbarians, were sophisticated astronomers who also knew that Earth was a sphere or globe. This, of course, was pure anathema to the archaeologists, and soon they were again up in arms. As our colleague and friend John Anthony West once remarked:

> There are few things in this world more predictable than the reaction of conventional minds to unconventional ideas. That reaction is always and invariably some combination of contempt, outrage, abuse and derision. . . . However, this standard reaction may be seriously muted or further enhanced by a potent new wild card, added to the deck only in the latter half of the twentieth century: the PR factor. If the unconventional idea attracts wide public interest, that is to say if it is easily understood and is "sexy" enough; especially if it results in bestselling books, extensive TV coverage or movie blockbusters, the attack gets ratcheted up. . . . As long as the public interest is there, Hollywood and television can be relied upon to keep stirring the pot no matter what the "experts" say. And sooner or later the cynics, skeptics and debunkers at the *New York Times, Scientific American* and *Skeptical Inquirer* will be forced to confront the offending idea.[13]

This time, however, they faced a less accommodating opponent than the passive Sir Lockyer. Hawkins's book became a bestseller, and, with his solid academic reputation, the archaeologists had much trouble quenching the huge interest and support Hawkins received from the public and media. Hawkins had singlehandedly forced the scholars out of their ivory towers and made them face up to the challenge. What made matters even worse for the skeptics was the support that he received from academic heavyweights such as Sir Fred Hoyle, who not only confirmed Hawkins's calculations but also agreed that "a veritable Newton or Einstein must have been at work"[14] at Stonehenge three millennia ago.

Hawkins was soon followed by a Scotsman, Alexander Thom, an engineer with a keen interest in the ancient megaliths and prehistoric monuments of the British Isles. After years of meticulous investigation of the astronomical alignments of these ancient sites, Thom was convinced that all were the collective work of a pan-generation construction program that reached its pinnacle in 1850 BCE. He was able to show that many of the megalithic sites incorporated a common canon of geometry and mathematics that resembled what was supposedly invented by the Pythagoreans of ancient Greece—yet they appeared in the British Isles more than a millennium earlier! According to Thom, the dimensions of the prehistoric sites were determined by a common unit of measurement, about 2.72 feet in length, which he termed the *megalithic yard.* Thom proposed that these sites were meant to express magical ideas and symbolize important belief systems by making use of astronomical observations of the sun, moon, and stars.

This time, some archaeologists took notice with uneasy embarrassment, for it was becoming obvious that their elderly peers, in their zeal to defend their coveted turf, might have been too hasty in rejecting the research of Lockyer, Hawkins, and Hoyle. Alexander Thom's impeccable data and the razor-sharp mathematical logic in his book *Megalithic Sites in Britain* could not be ignored by unbiased archaeologists. Thom also managed to have articles published in the reputable and peer-reviewed *Journal of the History of Astronomy,* which gave much credence to his ideas. It seemed that, finally, the new science of archaeoastronomy had made a crack in the wall of archaeology.

Since Alexander Thom's days, the science of archaeoastronomy has gained much ground and popularity among the public and even with some Egyptologists and archaeologists of the new generation. Starting in the late 1960s, serious investigators began to feel more comfortable coming forward with their ideas on the astronomical alignments of ancient Egyptian temples and pyramids. The first major breakthrough came with the astronomer Virginia Trimble, who codiscovered the stellar alignments of the shafts in the King's Chamber of the Great Pyramid in 1963. This discovery opened the way for more research on the Egyptian pyramids and also encouraged others to come forth and brave the firewall of academic Egyptology.[15] Today many new players have entered this fascinating field of research, mostly because computer and satellite technology such as Google Earth, GPS, and user-friendly astronomy software have allowed amateurs to investigate ancient sites on a screen in the comfort of their office or home. Further, with the arrival of the Internet coupled with the exponential growth of computer and digital technology and electronic communication with easy access to downloading scientific publications, research on ancient cultures is no longer the monopoly of closed-door archaeological institutions or university and museum departments. Even so, Egyptologists and archaeologists still pull rank when new ideas threaten to topple their coveted applecart. We speak from our own experience when we published *The Orion Mystery* in 1994 and, later, in 2002, *The Origin Map.* We too endured from Egyptologists and archaeologists the all-too-familiar war of words and the debunking that is passed off as criticism.

There are, nonetheless, signs of a growing acceptance that connections do exist between astronomy and the orientation, alignments, and location of ancient sites. In 1981 the First International Conference on Archaeoastronomy was held at Oxford, in England, where astronomical alignments of temples were discussed openly and seriously. Then, in 1983, there took place the First International Conference on Ethnoastronomy at the Smithsonian Museum in Washington, D.C. In 1993 the world's attention was galvanized by the German engineer Rudolf Gantenbrink and his daring exploration with a miniature robot of the star shafts in the Queen's Chamber of the Great Pyramid of Giza and his stunning discovery of doors at their ends. Finally, in 2002, *National Geographic* staged a live television event in an attempt to open the Gantenbrink doors in the Great Pyramid. An estimated six hundred million viewers around the world saw the program. Thanks to the persistence of a new breed of archaeoastronomers such as Archie Roy of Glasgow University, Giulio Magli of Milano Politecnico, Edwin Krupp of the Griffith Observatory in Los Angeles, Anthony Aveni of Colgate University, Alex Gurstein of the International Astronomical Union, and Juan Belmonte of the Tenerife Observatory to name but a few, archaeoastronomy has now become an important aspect in the understanding of ancient cultures. Today a few major universities around the world have added new chairs for archaeoastronomy, and more scholarly papers, articles, and books are being published by professional archaeoarstronomers and serious amateurs alike. All this has caused a a large crack in the wall of Egyptology—and archaeoastronomy has slipped in to stand beside conventional archaeology as a major tool to study the pyramids, temples, texts, and tomb drawings of the pharaohs.

So when Kim Malville, a professor emeritus of astrophysics and planetary sciences at the University of Colorado, arrived at Nabta Playa in late 1997, he was greeted not by the usual tongue-in-cheek reception, which might previously have been expected from Egyptologists and archaeologists, but with a genuinely collegial reception and a great hope that he could help solve the mystery of the stone alignments there. At this point everyone working at Nabta Playa must have felt that under their feet was a potential intellectual and political time bomb, not only because of its great antiquity but also because of what Malville was there to confirm. Before we go into this, however, we must understand better why the CPE made the mistake of leaving out of their research and investigation the regions of Gilf Kebir and Jebel Uwainat, for even with the problem of their great distance from Nabta Playa, it should have been obvious that they were in some way related to the ancient people who developed Nabta Playa. Let us review, then, where and when this intriguing story of the Egyptian Sahara really began. Surprisingly, it was not in Egypt but in the dimly lit corridors of Balliol College, Oxford, England.

2

WANDERLUST

The journey of Hassanein Bey, graduate of Oxford University and now Secretary of the Egyptian Legation in Washington . . . a distance of 2200 miles, has been characterized by the Director of Desert Survey, Egypt, as "an almost unique achievement in the annals of geographic exploration."

EDITOR, "CROSSING THE UNTRAVERSED LIBYAN DESERT," *NATIONAL GEOGRAPHIC MAGAZINE,* SEPTEMBER 1924

To him who has the wanderlust, no other actuating motive for exploration is needed than the knowledge that a region is unknown to civilized man.

AHMED HASSANEIN BEY, "CROSSING THE UNTRAVERSED LIBYAN DESERT," *NATIONAL GEOGRAPHIC MAGAZINE,* SEPTEMBER 1924

OXFORD GENTLEMAN, QUEEN'S LOVER, AND DEEP DESERT EXPLORER

When we think of the Arabian deserts and their rolling landscape of golden dunes, for most of us what comes to mind are romantic figures such as Lawrence of Arabia, Omar Sharif, or even Rudolf Valentino. Few will think of Ahmed Hassanein Bey[*3] or even know who he was. It may come as a surprise to many, then, that according to the Royal Geographical Society of London, Hassanein Bey is ranked as the greatest desert explorer of all times, so much so that the director of the desert survey of Egypt at that time referred to Hassanein's desert exploration as "an almost unique achievement in the annals of geographic exploration."

So who really was Ahmed Hassanein Bey, and why is he important to our investigation into the origins of the pharaohs?

Ahmed Hassanein was born in Cairo in 1889. He was educated at an English private school, as was then customary for well-to-do families in Egypt. As a young man, he was sent to England to complete his gentleman's education at Balliol College, one of the most prestigious institutions of Oxford University. The very stiff-upper-lip education that he received there would serve Hassanein well for the diplomatic career he was destined to pursue in Egypt. Described by his peers and biographers as an exotic blend of court official, diplomat, Olympic champion (he represented Egypt in Brussels in the 1920 Olympics and in Paris in 1924), photographer, writer, politician, royal tutor (to the future King Farouk) and an incurable romantic (among his amorous conquests was the lovely Queen Nazli), Hassanein was the last of the great desert explorers. He also had an excellent family pedigree: he was the son of an eminent scholar of Al Azhar Islamic University as well as the grandson of Egypt's last admiral and naval hero. Endowed with such impeccable breeding and education, as well as having wit, charm, and panache, Ahmed Hassanein was to become one of the most influential figures in Egypt, holding no less than the high ranks of chief of the Diwan and chamberlain to King Farouk. It is said that the young king was so dependent on Hassanein that the latter's untimely death in 1946 triggered the demise of King Farouk, which finally led to his abdication and exile in 1952. Tall, slender, romantic, charming, polite, and dashingly handsome, Hassanein's true passion, however, was not politics or glamorous women but the open desert or, to be more specific, the great Egyptian Sahara. This passion would eventually drive him to undertake the most daring of desert expeditions and to discover one of the most mysterious places on earth.

He was always deeply loyal to the king of Egypt and a fervent believer in Egypt's sovereignty and independence—thus it is ironic that it was Hassanein's British education that would open doors for him and earn him a place of honor among famous explorers such as Burton, Stanley, and Livingstone. Oxford's Balliol College had—and still has—an illustrious reputation in molding promising young men into world leaders. It has an old boy's listing that reads like a

who's who of famous men: it includes kings, national presidents, prime ministers, top authors, famous scientists, and Nobel laureates. Hassanein mingled comfortably in such elite company and was a sporting hero with the university's fencing team. During his stay at Oxford, he made friends with many future diplomats—in particular, with Francis Rodd, the son of Sir Rennell Rodd, Britain's ambassador to Rome and its representative at the League of Nations. Francis would later become a fellow of the Royal Geographical Society and serve as president from 1945 to 1948. This connection was to be extremely useful in bringing Hassanein's desert exploits to the attention of this prestigious society. Ironically, however, his friendship with Francis Rodd would also bring Hassanein into contact with a certain lady who was to cause him much public embarrassment, as we will soon see.

Hassanein returned to Egypt on the eve of World War I and was immediately recruited as private secretary to General Maxwell, British commander in chief of the Egyptian forces. When Maxwell left Egypt in 1916, Hassanein joined the Ministry of Interior, where, according to British intelligence, he was instrumental in squelching an anti-British riot in Upper Egypt during the so-called Revolution of 1919. Meanwhile, Hassanein maintained his sporting interests. In 1920 he was captain of the Egyptian Olympic fencing team and won for them a bronze medal. It was during this time that King Fouad I appointed Hassanein personal tutor to the crown prince, the future and ill-fated Farouk, who, it was said, practically worshipped him. The king's mother, the lovely Queen Nazli, fell deeply in love with Hassanein, and they eventually married secretly in later years.

Hassanein's fascination with the Sahara began in 1916, when, along with his old Balliol friend Francis Rodd, he was sent on a very delicate mission by King Fouad to pacify the Senussi Bedouins of the Libyan Desert. The Senussi were a confederation of Bedouin tribes in Libya who were deeply religious and had sided with the Ottoman Turks against the British in World War I. As such, they were a serious and nagging threat to Egypt's western borders with Libya. This threat had forced the Anglo-Egyptian army to mobilize thousands of troops to protect the western frontier—troops that should have been put to much better use in fighting the Turks elsewhere. Against all odds, Hassanein managed to persuade the Sennussi tribes to unite and adopt as their leader a pro-British chieftain, Sayed Idris (the future King Senussi I of Libya). The Senussi stronghold was the oasis of Kufra located nearly 800 kilometers (about 497 miles) inland from the Mediterranean coastline. In 1879 only a German explorer, Gerhard Rohlfs, had managed to reach it, but even he was not allowed to enter the oasis; he was chased away by the aggressive and fanatical Senussi. Hassanein made up his mind that he and Francis Rodd would be the first foreigners to enter Kufra.

> The inspiration for it [the journey to Kufra and beyond] dated from 1916, when I went . . . on a mission to Sayed Idris el Senussi, at Zuetina, a tiny port near Jedabya in Cyrenaica. One of the purposes of the mission was to effect an agreement with Sayed Idris, as head of the Senussi and the most influential chief in Cyrenaica, which should prevent in the future Badawi [Bedouin] raids across the western frontier of Egypt. At Zuetina I renewed acquaintance with Sayed Idris whom I had already met, through his friendship for my father, when he was returning from [a] pilgrimage to Mecca in 1915. I told Sayed Idris of my ambition and desire to make the journey to Kufra, which had been visited only once by a stranger from across the desert's border, the intrepid German explorer Rohlfs in 1879. Sayed Idris was sympathetic with my desires, and asked me to let him know when I was ready to make the expedition. He promised to give me all the help he could in my undertaking. Early in 1917, in continuation of the same mission to the Senussi, I met their head again at Akrama, near Tobruk, and told him that I was still determined to make the journey. I proposed to go as soon as the end of the war should set me free. Sayed Idris again encouraged my determination and renewed his promise of co-operation. There was with me then on the same mission Mr. Francis Rodd, an old Balliol friend. We discussed the proposed expedition together, and agreed that we would be companions in it. At the close of the war Mrs. McGrath [a friend of Francis] brought me a letter of introduction from Mr. Rodd. She wanted to join us on the journey.[1]

Mrs. McGrath turned out to be none other than the notorious writer and traveler Rosita Forbes. When she was introduced to Hassanein in Cairo in 1920, she had already been divorced three years and had since traveled around the world. During the war she had been an ambulance driver in France and was awarded two medals for bravery, and she had also served as a journalist and informer for British intelligence in Damascus. In Cairo, Rosita moved in high circles and had befriended Colonel Lawrence Cornwallis, better known as Lawrence of Arabia. Rosita and Lawrence apparently met in secret, suggesting they had more than a casual friendship. Rosita also knew the celebrated author and adventurer Gertrude Bell.

It was Francis Rodd who introduced Rosita to Hassanein, and, according to some who knew them both, Rosita had an instant crush on the dashing and romantic Hassanein, but if there was any truth in this, neither Hassanein nor Rosita

ever made it known to others. It seems that Hassanein and Francis Rodd decided to take Rosita along on their proposed expedition to the forbidden oasis of Kufra. At the last minute, however, Francis dropped out, and although Hassanein must have had second thoughts regarding taking along an unmarried foreign woman in these uncharted and dangerous parts of the Sahara, especially one as liberal and feisty as Rosita Forbes, Rosita somehow had her way. Amazingly, even Sayed Idris granted permission to Hassanein to take Rosita to Kufra—on the conditions, however, that Rosita wear Arab dress and be passed off as Hassanein's Muslim wife.

The journey to Kufra and back took three months. It was fraught with danger and drama, and, according to some, the alleged romance between Hassanein and Rosita had turned sour. No sooner had they returned to Cairo in January 1921, than Rosita and Hassanein parted company. Rosita returned to her notes and alone wrote a book, *The Secret of the Sahara: Kufara,* which was published a few months later in London. In the book, Rosita unabashedly presents herself as the leader of the expedition, and Hassanein is demoted to a glorified guide. Hassanein was too much of a gentleman to complain about this, and, to his credit, he always spoke highly of Rosita. In any case, any doubts that Rosita might have furthered about Hassanein's leadership and abilities as an explorer were soon to be dispelled, for he was already planning —this time, singlehandedly—his next expedition into the deep Sahara. This expedition would make the Kufra journey with Rosita look like a stroll in a London park.

THE LOST OASIS

In the winter of 1922, hardly a year after the events with Rosita Forbes, Hassanein headed for the small Egyptian port of Sollum near the Libyan border. From there, he set out on what later would be hailed as one of the greatest desert journeys of all time—and this time there was no Rosita to steal his thunder. This time, too, Hassanein was under the full patronage of King Fouad I of Egypt and King Idris I of Lybia. This amazing and never-to-be-repeated journey is told in full in Hassanein's paper read at the Royal Geographical Society in London and also published in the society's journal in October 1924. Hassanein tells how he first led a camel caravan from the town of Sollum on the Mediterranean coast inland to the oasis of Siwa and from there to Kufra. After a short stay at Kufra, he took the caravan southward into totally unchartered and unexplored territory.

> There were also vague stories of the two "lost" oases of Arkenu and Uwainat lying well to the eastward of the trade route to Wadai. Those oases were almost mythical, situated as they are on no route that is travelled even by Badawi [Bedouins] or Blacks. I determined that I would go to the Sudan by way of the "lost" oases. If I could find my way to them and place them definitely on the map, it would be something worthwhile doing. . . . After leaving Kufra, the chief adventure of the expedition began. Here at last I was plunging into the untraversed and the unknown. What lay ahead? It was not the possible dangers of the journey, which made my nerves tingle and caused my spirits to mount with exhilaration—dangers are merely a part of the day's work in the desert. It was the realization that I was to explore hidden places; that I should go through a region hitherto untrodden by one of my own kind, and make, perhaps, some contribution, small though it might be, to the sum of human knowledge.[2]

Hassanein reached the first of the lost oases, Arkenu, after eight days of marching in blistering heat at daytime and bitter cold at night. This was a grueling trek, which he described as "the worst stretch of the entire journey."[3] After a few days in Arkenu, Hassanein set south toward the other lost oasis of Jebel Uwainat. He and his party traveled only at night due to the unbearable heat of day at this time of year. His Bedouin guide used the age-old tradition of night travel by navigating with the stars—which was, almost certainly, the same method used by the prehistoric people of Nabta Playa when they roamed the vast Sahara thousands of years earlier.

> The manner in which a Bedouin guide finds his way across the desert at night is a source of wonder to the uninitiated. In a region, which provides no familiar landmarks, he depends solely upon the stars. As we were proceeding in a southwesterly direction during most of our night trekking the polestar was at the guide's back. He would glance over his shoulder, face so that the polestar would be behind his right ear then take a sight to a star to the south in that line. He would march for perhaps five minutes with his eye riveted on this star, then turn and make a new observation of the polestar; for, of course, the star to the south was constantly progressing westward. He would then select a new star for guidance and continue.[4]

It took an overnight trek to reach the western flank of the lost oasis of Jebel Uwainat. There, he was confronted by a

huge rocky massif sprouting out of the flat desert like a giant iceberg: "The range in that vicinity rose in a sheer cliff from the desert floor. Heaped against it were masses of boulders, which through the ages had been worn smooth by the grinding, polishing action of wind and sand. It was as if here were piled the arsenals of Stone-Age giants whose weapons had been gargantuan slings."[5]

At Jebel Uwainat, Hassanein "found ample supplies of water in the deep-shaded recesses of the cliffs."[6] Usually, in these parts of the remote desert, water is found in very deep underground aquifers that are often far too deep to be reached by simply digging wells. Here at Jebel Uwainat, however, the water was at the surface, coming from the occasional rain that trickled down the rocks and collected in natural pools. Hassanein found four such pools (called *uwyun,* literally "eyes" in Arabic, and hence the name Uwainat, meaning "many eyes"), which had water that was "cool and of good quality."[7] In the days that followed, Hassanein and his men circumnavigated the outer rim of the Uwainat massif, and at night, they camped in the dry wadis (valleys) and always assumed that they were completely alone in this strange wilderness. One morning, however, as Hassanein woke up, standing before him was a young Black woman holding a bowl of milk in offering. She was slender and very beautiful, and Hassanein at first thought he was having a dream. The woman spoke a strange language, which Hassanein's guide recognized as being of the Tebu people, pastoral nomads known to have once roamed this part of the Sahara. The young woman offered to take them to the king of Uwainat. He turned out to be a Black man called Herri who claimed to rule over some one hundred and fifty Tebu who lived there. King Herri spoke of mysterious rock carvings of animals and men not known in this part of the Sahara, and Hassanein was taken to see them.

> The animals are rudely drawn, but not, unskillfully carved. There are lions, giraffes, ostriches, and all kinds of gazelles, but no camels. The carvings are from a half to a quarter of an inch deep and the edges of the lines in some instances are considerably weathered. "Who made these?" I asked Malakheni, the Tebu. He expressed the belief that they were the work of the *jinn* [demons]. "For," he added, "what man can do these things now?" What man among the present inhabitants, indeed! Here is a puzzle, which must be left to the research of archeologists. Suffice it to say that there are no giraffes in this part of Africa now, nor do they live in any similar desert country anywhere. Perhaps even more significant is the absence of camels from the drawings. If they had been native to the region at the time that the carvings were made, surely this most important beast of the desert would have been pictured. But the camel came to Africa from Asia not later [than] 500 BCE. Can these carvings antedate that event? Or has the character of this country undergone such astonishing modification to have converted into desert a fertile region in which the giraffe roamed, and the camel was not a familiar burden-bearer? With the inspection of these rock carvings, my hasty exploration of Uwainat was concluded.[8]

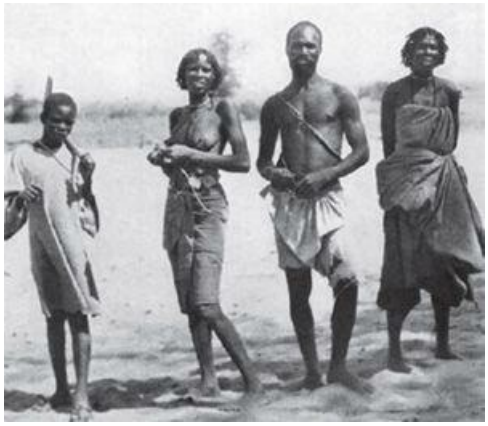


Figure 2.1. The tebu of the Sahara photographed by Ahmed Hassanein, 1923. Courtesy of SaharaSafaris.org/hassaneinbey.

Figure 2.2. King Herri of Unwainat photographed by Ahmed Hassanein, 1923. Courtesy of SaharaSafaris.org/hassaneinbey.

Hassanein turned down an offer by Herri to show him more of these rock carvings. He felt that it was not wise to linger too long in these uncertain circumstances. Hassanein did realize, nonetheless, the great importance of his discovery, for he later wrote: "[I]t was in Uwainat that I made the most interesting find of my 2,200-mile journey. I had heard rumors of the existence of certain pictographs on rocks . . . on the evening of our arrival I set out to find them."[9] As we will see, what Hassanein had discovered, although he himself never knew this, was the first irrefutable evidence of a prehistoric presence of humans in this remote part of Egypt. Many decades later, scholars would begin to see in them the origins of the pharaohs and, quite possibly indeed, of civilization as we know it.

Upon his return to Cairo several months later, Hassanein was received with honors and given the title of *pasha* (akin to "lord") by King Fouad I, as well as being hailed as a hero by the World Press. The Royal Geographical Society of England gave him the highly coveted gold medal, and he also received a knighthood. Hassanein deserved this admiration and honor. He was now also fully vindicated, and any doubts and misconceptions about his ability as a deep desert explorer were now removed. Rosita, however, was unrepentant. She still managed to cause further embarrassment at the Royal Geographical Society, where she claimed that she had been the second European, after Gerhard Rohlfs, to reach the oasis of Kufra—implying, of course, that Hassanein, being an Egyptian, did not really count. Many of the members of the Society took offense, and the usually restrained and friendly Gertrude Bell could not help remarking of Rosita: "[I]n matter[s] of trumpet-blowing she is unique. . . . I am sick of Rosita Forbes! And the thing that makes me sickest is that she scarcely ever alludes to that capital boy, Hassanein, who was with her, an Egyptian, without whom she couldn't have done anything. . . !"[10]

THE DESERT PRINCE AND THE ENGLISH PATIENT

Another Egyptian of similar impeccable breeding immediately followed in the footsteps of Hassanein. This was the heir to the throne of Egypt, Prince Kemal El Din Ibn Hussein. Prince Kemal, who had received his education in Austria, refused the throne in order to pursue a career as a desert explorer and cartographer. Inspired by the recent exploits of Hassanein, Prince Kemal set about organizing and financing his own expeditions into the Egyptian Sahara—but this time not by camel caravan, as Hassanein had done, but with automobiles for off-road travel that were specially designed for him by Citroen and Ford. With these vehicles, Prince Kemal set out in 1926 from Cairo to Dakhla, and from there into the deep desert southwest toward Jebel Uwainat. Some 400 kilometers (249 miles) beyond Dakhla (and still 200 kilometes—124 miles—from Jebel Uwainat), Prince Kemal discovered an immense mountain range, which he christened Gilf Kebir. Amazingly, back in 1923 Hassanein had missed seeing it because he had traveled south from Kufra to Jebel Uwainat and was thus 100 kilometers west of Gilf Kebir.

The mountain range of Gilf Kebir is 300 kilometers (186 miles) long and some 80 kilometers wide. It is almost the size of Switzerland and, when approached from the west, seems to jut out of the flat desert like a monstrous tsunami in stone. Prince Kemal had much better scientific equipment at his disposal than Hassanein, and he was able to fix firmly all these new locations, including the peaks of Jebel Uwainat, on the ordinance map of Egypt. He missed seeing, however, the extensive prehistoric rock art that is found on the west side of Gilf Kebir. This was discovered later by another explorer whom Prince Kemal would actually sponsor: none other than the enigmatic and colorful Count Lazlo Almasy, a Hungarian aristocrat who, among many other things, is said to have been a secret agent for the Germans in World War II.

Almasy planned an expedition to Gilf Kebir with fellow travelers and sponsors Baron Robert Clayton and Robert's pretty wife, Lady Clayton. The three were immortalized in the 1996 movie *The English Patient.* The trio proposed to get to Gilf Kebir by air with a single-engine Gipsy Moth airplane owned by the Claytons. Accompanying them were Patrick Clayton of the desert survey unit (and no relation to Baron Clayton) and wing commander H. S. Penderel, who was to pilot the airplane. Their objective was to search for the fabled lost oasis-city of Zarzora, a sort of Shangri-La of the desert, which Almasy believed was tucked away somewhere in the newly discovered Gilf Kebir. With their fantastic stories of an oasis lost to the world, Bedouins had long fantasized about the legend of Zarzora. They described it as having wonderful springs and being surrounded by a white wall that hid magnificent castles and gardens. They believed it was southwest of Dakhla, the farthest inhabited oasis in Egypt.

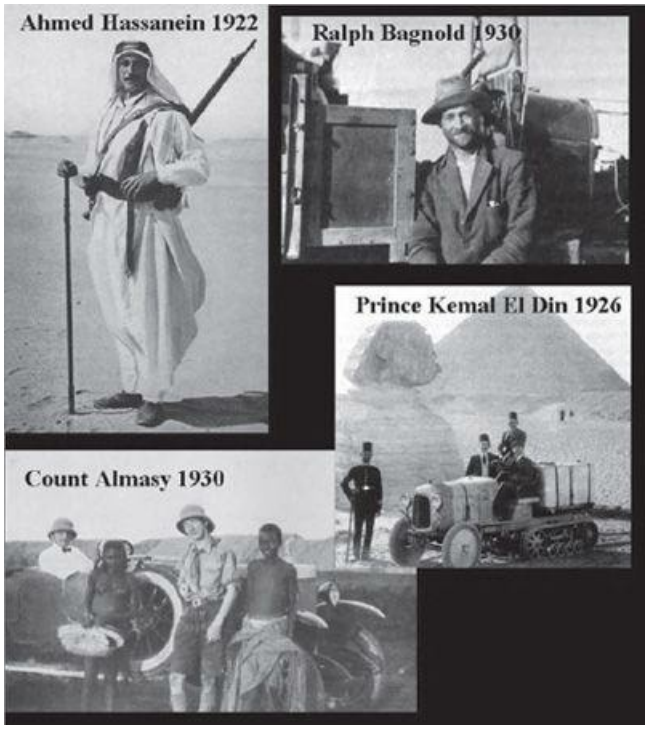


Figure 2.3. Early Egyptian desert explorers, clockwise from left: Ahmed Hassanein in 1922, Ralph Bagnold (see chapter 4) with desert vehicle in 1930, Prince Kemal el Din with tract vehicle in 1926, and Count Lazlo Almasy ca. 1930.

At Gilf Kebir, Almasy and his friends discovered the now-famous Caves of Swimmers at the mouth of a valley on the west side of Gilf Kebir. These two caves—more like deep ledges—contained a plethora of rock art that was actually drawn on the sandstone with vivid colors rather than carved. It depicted Black men, women, and children in social activities, some clearly enjoying swimming and diving in a river or lake. (See chapter 5 for more description when we recount our own expedition to Gilf Kebir.) Meanwhile, flying west from Gilf Kebir with the Gipsy Moth, Almasy and his colleagues spotted a group of lush valleys with unusual amounts of trees and vegetation, which they thought was the fabled oasis of Zarzora. Later, however, in 1932, when Almasy re-explored the region on the ground, he found no springs or white walls—not even the slightest signs of human habitation, let alone stone castles. Instead, he found typical wadis with the usual rugged acacia trees and a few shrubs here and there. In fact, there were three wadis (valleys) called Abdel Malik, Hamra, and Talh, which were already known to the ancient Tebu people of the region and which, at least according to Almasy's account, the Tebu also called Zarzora.

Yet, like the fabled lost oasis of Shangri-La or the mythical Atlantis, the legend of Zarzora still persists to this day, and, as we will see, it still lures eccentric explorers in search of adventure and glory. There is a strange irony about all these modern explorations and their claims of discovering of this or that lost oases, however: none of these places were lost at all. Instead, they were known to the ancients and were only rediscovered in modern times. Hassanein and Prince Kemal were definitely not the first Egyptians to reach Jebel Uwainat and Gilf Kebir, for the ancient Egyptians had in fact already beaten them to it by several thousands years.

THE EXPEDITIONS OF HARKHUF

About forty-two hundred years ago, on the very beautiful island of Elephantine near Aswan, a man of high rank named Iry and his eldest son Harkhuf were preparing for the most daring desert expedition ever to be attempted in antiquity or,

indeed, even in modern times. On the command of the ruling pharaoh, they were about to leave their tranquil and lush island on the Nile and set out westward into the open and uncharted desert. In those days, this adventure would have been the equivalent of a first manned NASA mission to Mars. Indeed, the faraway region that they would eventually reach is so similar to the Martian landscape that the Egyptian scientist at NASA, Dr. Farouk El Baz, actually uses it as a model to study the geology of the Red Planet.[11]

Iry had been chief lector priest to the pharaoh Pepi I, and after the king's untimely death, Iry retained the same post under the new pharaoh, Merenre I (sixth dynasty, 2323–2150 BCE). Upon their return, and after Iry passed away, his son Harkhuf succeeded him as chief lector to Merenre I and also to this pharaoh's successor, the boy-king Pepi

II. Harkhuf was also appointed governor of Aswan and Elephantine. It was under the orders of King Merenre I and then later King Pepi II that Harkhuf and his father, Iry, mounted several expeditions into the deep desert to "explore the way to the land of Yam."[12]

But where was Yam, and why was it so important for the pharaohs to send their most trusted advisors on such a dangerous mission . . . one from which they might never have returned? The location of the land or kingdom of Yam has long confounded Egyptologists. Some have believed it to be located south of Aswan, between the first and second cataracts of the Nile; others have thought that it was in the west, in the region of the inhabited oases such as Kharga or Dakhla.[13] These relatively accessible locations were proposed by Egyptologists because, until recently, scholars were convinced that the ancient Egyptians could not travel into the deep desert but could journey only southward along the Nile Valley or westward, but no farther than the habitable oases. Beyond these oases lies a seemingly endless and lifeless desert, a vast expanse of pure nothingness of sand, dust, and rocks, and so Egyptologists insisted that no one in their right mind would attempt to venture there without being sure they could return safely. The practical problem is that the maximum distance that anyone can travel into this waterless desert on foot (or by donkey, as Harkhuf did) is about 200 kilometers (about 124 miles), unless there are some water sources along the way. Any farther would mean a certain gruesome death by dehydration. Gilf Kebir and Jebel Uwainat, however, are a staggering 650 kilometers (400 miles) west of the Nile, and the journey to these places is theoretically impossible without a means to replenish the caravan with water and food.

In addition, it seems that another issue—one of a spiritual nature—troubled the ancient Egyptians: they apparently regarded the Sahara as the place of death and a place where evil spirits lived. Thus, according to the Egyptologists, they would certainly have refrained from venturing too far into it.

Finally, and more to the point, there was not a single shred of evidence that could attest to the presence of ancient Egyptians beyond the oases. Although on the one hand there is much evidence of their presence in all five major oases of the Egyptian Sahara—Kharga, Dakhla, Siwa, Bahareya, and Farafra—in the form of temples, tombs, and an abundance of artifacts, there was for a long time absolutely no trace of them beyond the vicinity of these oases. Because of this lack of evidence, then, and also because of the forbidding geographical conditions, Egyptologists concluded that no one in ancient times had traveled into the deep desert. Indeed, it was not until relatively recent times—in 1879, to be more precise—that the likes of explorers such as Gerhard Rohls, and later, in 1920, Hassanein and Rosita Forbes, attempted such deep-desert journeys. The Egyptologists concluded that even if Yam was in the Egyptian Sahara, it must have been one of the habitable oases, either Kharga or Dakhla. As far as they were concerned, Gilf Kebir and Jebel Uwainat, let alone anywhere beyond these, were simply too far and out of reach for Harkhuf.

Nevertheless, some open-minded Egyptologists admitted that Yam's "location remains uncertain. . . . [O]nly new archaeological discoveries inscribed or otherwise, could resolve the issue."[14] This last statement—that ancient inscriptions could resolve the issue—was uncanny, for, as we will soon see, that is precisely what did happen in late 2007: ancient inscriptions were found that finally helped locate the lost kingdom of Yam. Before we go into this, however, let us re-examine the writings of Harkhuf (they are inscribed on the walls of his tomb at Aswan) and see for ourselves what can be derived from them. Here is the full text translated by French Egyptologist Claire Lalouette:

> His Majesty Merenre, my master, sent me, together with my father, Sole Companion and Lector-Priest, Iry, to the land of Yam to explore its ways. I carried out this mission in seven months, I brought back all sorts of tributes, beautiful and rare and I was praised for it very highly.
>
> His Majesty sent me a second time, alone. I went by way of the Elephantine road and returned via the land of Irtet, Makher and Teres of Irtet at the end of a voyage of eight months. I returned carrying tributes of this land in very great numbers, of a kind, which nobody had ever brought to Egypt before. I returned, coming from the camp of the chief

of Setu and Irtet after having explored this land. You will find no other Sole Companion, Chief of interpreters who has reached [so far] into the land of Yam before.

His Majesty sent me for a third time to the land of Yam. I went there from the Nome of Thinis by the oasis road and I observed that the chief of the land of Yam had left for the land of the Timhiu to chastise them, as far as the western corner of the sky. I followed his trail to the land of the Timhiu and I pacified him until he adored all the gods for the sake of the royal Sovereign. [I shall make haste . . . with a man from the land of Yam] . . . so that His Majesty Merenre, my royal Lord, shall know [that I went to the land of Timhiu] following the chief of the land of Yam. After having given satisfaction to this celebrated chief . . . I returned with three hundred donkeys burdened with incense, ebony, hekenu perfume, grain, panther skins, elephant tusks, many boomerangs, and all kinds of beautiful and good presents. When the chief of Irtet-Setu-Wa-Wat saw how strong and numerous were the troops of the land of Yam returning with me towards the residence [marching] in the company of the army which had been sent with me, he handed over, to be given to me, bulls and goats and guided me through the ways of the hills of Irtet —because of the skill and the vigilance which I had shown, more than any other Companion, Chief of interpreters, former envoy to the land of Yam. Then, this servant followed the course of the river as far as the Residence; and it was arranged that the prince, Sole Companion, Steward of the two halls of libation [?] came to meet me with ships loaded with date wine, cakes, bread and beer.

THE PRINCE, TREASURER TO THE KING OF LOWER EGYPT, SOLE COMPANION, LECTOR-PRIEST, TREASURER OF THE GOD, SECRET COUNSELOR FOR THE DECREES, THE IMAKU, HARKHUF [15]

In this inscription, Harkhuf claims that he "carried out this mission in seven months," and another in eight months. The Egyptologist James H. Breasted translated Harkhuf 's statement thus: "I did it in only seven months!" Clearly this shows that Harkhuf was proud of his accomplishment of the time it took him to go to Yam and return, otherwise he would not have boasted about it.[16] We know too that Harkhuf used donkeys for these journeys (the camel was not known in Egypt until much later). Any experienced desert traveler knows that a donkey laden with a typical load of 60 kilograms (about 130 pounds) can travel only 15 kilometers (about 9 miles) a day average (allowing for rest breaks) and even fewer kilometers if the terrain is rough and craggy.

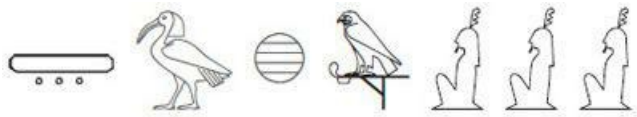
In the ancient Egyptian calendar, seven months amounted to 210 days. Therefore, we can estimate the distance of Hakhuf's travel to Yam and back as 3,150 kilometers (1,957 miles). Yet the distance from the Nile Valley to Kharga and back is only 400 kilometers (249 miles); and to Dakhla and back, the distance is 540 kilometers (336 miles) and would take only thirty-six days at the most. If either Kharga or Dakhla were Harkhuf's destination, as some Egyptologists have claimed, then surely Harkhuf would not have boasted to the pharaoh that he "did it in only seven months." The conclusion must be that Yam is much farther than either Kharga or Dakhla. Our estimate shows that it must have been at least some 1,500 kilometers (about 932 miles) from the Nile Valley at Aswan, most certainly in a southwestward direction. Most Egyptologists, however, have insisted that Harkhuf traveled south, albeit probably first going west to the Kharga oasis, but then turning south along the Darb El Arbaeen (the so-called Forty-Days Trail) parallel to the Nile to reach a place between the second and third cataracts in the Sudan, where, some say, Yam could also have been located. [17] Other than the fact that the distance to this location and back would be only 1,000 kilometers (about 621 miles), and thus 2,150 kilometers (1,336 miles) short of our estimate, we must also wonder why Harkhuf chose to travel in the desert parallel to the Nile to reach the second cataract when he could have much more easily sailed by boat on the Nile itself. To explain this, Egyptologists have speculated that perhaps the region on the Nile south of Aswan was in the hands of hostile tribes, and Harkhuf may have wanted to bypass them by traveling inland in the desert. In his inscriptions, however, Harkhuf makes it clear that Yam was somewhere very far. He started in Upper Egypt and traveled along the "oases road" and then westward "to the western corner of the sky"—and not, as Egyptologists claim, south toward the Sudan: "I went there from the Nome of Thinis [Upper Egypt] by the oasis road and I observed that the chief of the land of Yam had left for the land of the Timhiu to chastise them, as far as the western corner of the sky. I followed his trail to the land of the Timhiu." The Timhiu or Temehou are often said by Egyptologists to be the ancient dwellers of the Sahara in southern Libya. This belief prompted the American Egyptologist Hans Geodicke of Johns Hopkins University to ask, "Where did the chief of Yam go in 'the land of the Libyans' 'to beat the Libyans'"? The intention attributed to the chief of Yam "to beat the Libyans to the Western corner of heaven" makes it clear that the chief of Yam had gone in a westerly direction.[18]

Yet Hans Goedicke, like all Egyptologists before him, held firm that the ancient Egyptians could not travel into the

deep desert beyond the oasis of Dakhla. He therefore concluded that Kharga was the land of Yam and that Dakhla was the land of the Timhiu (Libyans). But this is clearly incorrect, for we have already seen that if this was the case, Harkhuf 's boast that it took only seven months to go to Yam and return does not make sense. Yet going farther due west does not make much sense either, because this direction would have taken Harkhuf directly into the Great Sand Sea, a formidable barrage of high dunes that even today cannot be crossed without specially equipped four-wheel-drive vehicles.

So which direction did Harkhuf take? The phrase "western corner of the sky" gives us a clue. The ancient Egyptians saw the sky as being held up by four pillars at each corner. In addition, at the time of Harkhuf, they defined the horizon as having two parts: east and west. The "western corner of the sky," therefore, implies the southwest corner—and it leads toward Gilf Kebir and, beyond it, to the Tibesti highlands in Chad. As we have seen, however, such a journey is not possible without adequate sources of water along the way, and no such water sources, either on the way or at Gilf Kebir itself, existed. The first available water is 200 kilometers south of Gilf Kebir, at Jebel Uwainat. Interestingly, though, in a 1965 article by G. W. Murray, the director of the topographical survey of Egypt, Murray explains that he examined the inscriptions of Harkhuf, and he suggests: "The Land of Temeh [Timhiu/Libyans] was an Egyptian expression for the inhabited parts of the southern Libyan desert. They were widely scattered . . . [I]n the far south-west, the sandstone massif of the Gilf Kebir made up, to borrow a phrase from the Chief of Yam, 'the western corners of heaven. . . .'"[19]

Bearing this in mind, we can note another intriguing term found in the letter written to Harkhuf by the young King Pepi II. In this letter, Pepi II refers to Yam as *ta-akhet-iu,* which Egyptologists translate as "land of the horizon dwellers." In hieroglyphs it is written thus:



"Land of the horizon dwellers" implies that Yam was a very distant place—so distant that its people were deemed to live in the horizon. The historian A. J. Arkell even suggested that Yam was as far in the southwest as Darfur in the Sudan.[20] Where exactly was Yam, however, and who or what were the mysterious horizon dwellers?

We know with absolute certainty that, millennia before Harkhuf went to Yam, the southwest corner of the Egyptian Sahara either was inhabited or visited regularly by a Black people as attested by the rock art found at Gilf Kebir and Jebel Uwainat. Since 2003 we have known that these Black people were also in the Nabta Playa region, thanks to the CPE's discovery of a prehistoric cemetery only 20 kilometers (about 12 miles) from Nabta Playa near a large sand dune called Jebel Ramlah.

> [T]he anthropological and forensic analysis] . . . show that two different populations—Mediterranean and sub-Saharan—co-existed here [at Gebel Ramlah near Nabta Playa] . . . [T]he people who inhabited the shores of the Gebel Ramlah lake were not cut off from the rest of the world. Their contacts sometimes stretched very far, as is evidenced by unearthed objects made of raw materials that were not to be found in the vicinity, and must have been brought in from outside. The best example of such long-distance imports is a nose plug made of turquoise, the closest sources of which are located 1000 km. to the north on the Sinai Peninsula. Shells were brought in either from the Nile, 100 km. away, or from the Red Sea much further to the east. . . . Ivory was brought from the south, since elephants, which belonged among the Ethiopian fauna, could not survive in such dry savanna. . . . The typical beliefs of the ancient Egyptians [to preserve the body so that the spirit could rest in peace in the afterworld] may indeed have originated with the Neolithic peoples inhabiting the ever-drier savannah in what is today the Western Desert, only centuries prior to the emergence of ancient Egypt. In the basin of the dried-up Nabta Playa lake, located only 20 km. away, the same people who left behind the graveyards at the foot of Gebel Ramlah, erected gigantic clusters of stelae, extending over many kilometers. . . . Perhaps it was indeed these [prehistoric] people who provided the crucial stimulus towards the emergence of state organization in ancient Egypt.[21]

Here, at the foot of the dune, the CPE found three burial areas that contained human skeletons of sixty-seven individuals dated to six thousand years ago. According to Fred Wendorf and Romuald Schild of the CPE, "physical anthropology of rare skeletal remains . . . suggests racial association of the populations with the Sub-Saharan or Black groups."[22] In many burials, the bones of several individuals were placed together, thrown pell-mell, as if they had been brought to the grave in bags. This suggested to the anthropologists that the individuals may have died elsewhere in the

Sahara, and their bones were brought back to their home settlement for burial near their ancestors. From this evidence, it seems that the Black people of Jebel Ramlah and Nabta Playa ventured far and wide in the Sahara when the climate was humid and the desert fertile. Could these people be the same as those of Jebel Uwainat and Gilf Kebir? Further, could they all have originated in the mysterious land of Yam?

If such thoughts were held by Fred Wendorf and Romuald Schild, then they kept them to themselves as far as we know. At this stage we cannot help but recall that, in 1923, Ahmed Hassanein encountered a colony of black-skinned people at Jebel Uwainat, and we can also recall the Tebu man who claimed that the prehistoric art that was found there was his ancestors'. According to the Sahara historian J. L. Wright, these people that Hassanein encountered were Tebu refugees from the Goran tribe who originally had come from the Tibesti Mountains in northern Chad.[23] Hassanein was able to confirm this when he wrote, "The southern portion of the Libyan Desert is inhabited by tribes of blacks—Tebu, Goran, and Bidiat—who are rather more refined in features than the central African negroes."[24]

Unfortunately, before anyone could determine from where these Black people at Jebel Uwainat had originated, they left the region sometime after Hassanein's visit, never to be seen again. It is probable they returned to the oasis of Kufra, where, from time immemorial some of the ancient Tebu lived until the Arab conquest in the eighth century.[25] Were the ancestors of the Tebu, then, those people who were called Temenu by the ancient Egyptians and who, as Harkhuf reported, were chased by the "Chief of Yam" to the "western corner of heaven"? Further, could their true place of origin have been far in the southwest, into the highlands of northern Chad? Until recently, the answer from Egyptologists and anthropologists would have been a resounding no—that is, until there came another aficionado of the desert to join the ranks of Egyptian Sahara explorers such as Rohlfs Gerhard, Ahmed Hassanein, and Count Lazlo Almasy.

FROM FORD COMPANY TRAINEE TO CAMEL DRIVER

Carlo Bergmann arrived in Egypt in the mid-1980s. He was sent there by the Ford Motor Company to complete a management-training course. After a visit to the camel market in Cairo, Bergmann was so fascinated by these "ships of the desert" that he resigned from his job then and there and bought his first camel in order to become a desert explorer. He set up a base in the oasis of Dakhla, increased his camel fleet to twelve, and roamed the desert in search of lost oases. Bergmann was eventually solicited by Dr. Rudolf Kruper of the Heinrich Barth Institute to assist him in his explorations southwest of Dakhla. Carlo, however, was not impressed with the way the archaeologists explored from the comfort of their four-wheel-drive vehicles. He believed that moving by camel or on foot radically increases the chances of spotting something of value. With the desert's blinding sunlight and a landscape that is much the same everywhere, an explorer could easily miss seeing even the entrance to a cave unless he vigilantly checked every rock and mound along the way. Carlo Bergmann also had the advantage of a sixth sense regarding where to look for prehistoric artifacts—an ability he developed after years of exploring the desert on foot.

Bergmann knew that Bedouins in the past told stories about a lost temple in the open desert a few days' march from Dakhla oasis. They told the British archaeologist Sir Gardner Wilkinson in 1835, "Some ruins of uncertain date [were] discovered about nine years ago by an Arab in search of stray camels . . . [and that their ancient] inhabitants are blacks."[26] Bergmann also knew that Wilkinson had not attempted to verify the story, probably because he discounted it as a tall tale told by imaginative Arabs. The same happened in 1910 to the British engineer and explorer W. J. Harding King, who was also told by Bedouins of a stone temple that existed "eighteen hours journey west of Gedida in Dakhla Oasis,"[27] but much like Wilkinson before him, Harding King dismissed the story as twaddle. Carlo Bergmann, however, took these stories seriously, and, in 2000, after six attempts to locate the alleged stone temple, he did, in fact, find something that matched the description and location given to Wilkinson and Harding King.

> The "stone temple" revealed itself as a conical hill about 30 meters [about 98 feet] high and 60 meters [about 197 feet] in length. On its eastern side there is a natural terrace. This platform, which has an average width of 3 meters [about 10 feet] and a length of approximately 35 meters [about 115 feet] is about 7 meters [23 feet] above the ground and fenced by a dry wall of stone slabs. From the distance the place has some resemblance with the Nabataean rock-palaces and -tombs at Petra. When setting my foot onto the terrace my eyes glanced over a breathtaking arrangement of hieroglyphic texts, of cartouches of Khufu [Cheops] and of his son Djedefre, of short notes from stone-masons, of two figures of a pharaoh smiting the enemies and of enigmatic signs [water mountain symbols] evidently placed on the rock-face in wilful order. All these engravings were depicted in the midst of representations of animals and human figures from Prehistoric and Old Kingdom times. As pharaoh DjedefreÂ´s

name first caught my eye, I christened the site DjedefreÂ´s water-mountain.[28]

There are hieroglyphic texts carved on the east face of the DWM that report that the pharaoh Khufu (fourth dynasty and builder of the Great Pyramid at Giza) ordered two “overseers of recruits” called Iymeri and Bebi to take an expedition of about 400 men (two regiments) into this “desert region” to collect a substance named “mefat,” which, according to Egyptologists, was probably a mineral powder used for making red paint. The expedition took place in “the year of the thirteenth count of cattle,” which Egyptologists reckon to be the twenty-sixth year of reign of Khufu. The inscription reads:

> the year after the 13th occasion of the census of all large and small cattle of the North and the South of the Horus Medjedu (Khufu) given life eternally, the overseers of the recruits of the escort, Imeri and Bebi, they came with two regiments of recruits under their command, to make “Mefat” from the pigments of the desert district.

A strange word that is found in the inscriptions and previously not known to Egyptologists is *Mefat* (MefAt). But the term *fat* or *at* was known and generally taken to mean “powder” or “dust,” which led many experts to propose that mefat was probably red ocher (ferric oxide), which is used to make red paint. Because the pyramids of Giza and the sphinx are believed to have been originally painted red (partly at least), the suggestion that this expedition was for this purpose is a viable one, although far from being proved. Lending support to this connection with Giza is also several “seals” and “leather bags” dated to the fourth dynasty found at Giza; the “seals” mention expeditions of four hundred men sent to the desert to collect red ocher, and some of this substance was found in the leather bags. But the precise meaning of Mefat is still debated among experts, and Carlo Bergmann, the discoverer of the DWM, has proposed that it may not be “inorganic” but perhaps some organic substance. Here are Bergmann’s views on Mefat:

> According to Kuhlmann, the translator of the fourth-dynasty inscriptions at DWM (Kuhlmann, K., “the Oasis bypath or the issue of desert trade in pharaonic times,” in Tides of the desert, 2002), the Old Kingdom expeditions of Khufu and Djedefre had come to the site (and to Biar Jaqub) in order to produce powder (mefat) from SS’pigments (?) taken from the “desert district.” The term SS’ has not been substantiated in hieroglyphic writing. Despite of scrupulous search for ancient pigment-quarrying activities, which (in a landscape where ancient relics have prevailed undisturbed over long periods of time) would remain conspicuous up to date, not the slightest indication of such works was found. Is, therefore, Kuhlmann’s interpretation of SS’ meaning “pigment” inconsistent with the findings of our investigation? Or was SS’ collected merely from the ground, thence leaving no traces of its removal? Furthermore, is SS’ really an unorganic pigment or is it of organic origin? A trial-trench at DWM has brought to light three hearths, seal impressions, potsherds of cups, bowls, and storage jars characteristic of the early Old Kingdom as well as shale-tempered pottery of the Sheikh Muftah group. In one of the hearths numerous parts of locusts and even complete specimens, which had been roasted on the spot, were found. Most probably insects like these, the former having been radiocarbon dated to about 2600 BC, were part of the daily diet of, at one time, some four hundred followers of Khufu. For such purpose great amounts of locusts must have been collected in the vicinity of DWM. Do their remains attest for sufficient vegetation in Biar Jaqub; “green land,” by which the insects once were attracted? If Biar Jaqub has to be envisaged as a florishing oasis during Old Kingdom times, the probabilty of SS’ being a much-esteemed organic substance should be estimated high. An investigation of the hill in ½ kilo-metre distance to the stonecircle settlement revealed no traces of ancient mining operations. If, in one way or the other, SS’ was obtained from here (as a pigment incorporated in the sandstone or in layers of variegated shales fused into the rock), would it then not have made sense for the ancients to errect their settlement at the foot of the prominent landmark? During all of the winter such considerations occupied my mind. Later, back in Germany (in early summer of 2005), Friedrich Berger and Giancarlo Negro called my attention to a press release, which reported the discovery of fourth dynasty seals and leather bags containing ferric oxide. According to inscriptions on pieces of pottery belonging to the find, the expedition, which consisted of more than four hundred men, had been sent to the “desert district” in search of red paint to decorate the pyramids. The discovery was made by Egyptian archaeologists in the region of the Giza pyramids.[29]

Djedefre Water Mountain, as Bergamann now called it, is 80 kilometers (about 50 miles) southwest of Dakhla oasis and is now under the supervision of Egypt's Supreme Council of Antiquities (SCA). Until recently, however, it was investigated by the German Archaeological Institute in Cairo and the Heinrich Barth Institute of the University of Cologne. The German team reported that the hieroglyphic inscriptions found on the east side of the mound mention several expeditions during the twenty-fifth and twenty-seventh years of the reign of the pharaoh Khufu, builder of the Great Pyramid at Giza (ca. 2450 BCE). They noted, too, that the name of Khufu's son and successor, Djedefre, is more prominent and appears alongside (and also within) the so-called water mountain sign, which Bergmann describes as "a pack of horizontal zigzag lines framed by a sharply incised and slightly rounded rectangle, the upper corner of which ending in two small humps."[30]

Figure 2.4. Aerial view of Giza pyramids. Note the eastern offset of the third/smaller pyramid.

Djedefre Water Mountain also has engraved on its walls rock art, which is clearly prehistoric, for it depicts giraffes, elephants, and other creatures that since at least 4000 BCE could be found only thousands of kilometers farther south in Africa but must have been here near Dakhla before that date when the Sahara was fertile. Most of the prehistoric rock art and the pharaonic inscriptions are high up on the east face and about 8 to 10 meters (about 26 to 33 feet) above ground level. They can be reached by an ancient man-made escarpment that leads to a platform cut into the mound. The platform itself faces due east, the direction of sunrise, and it is very evident that at dawn on this platform there is astronomical meaning to this orientation, as we will discuss in chapter 4. The most prominent inscription is found dead center of the east face and, inside a rectangle that has two protrusions or peaks at the top, bears the name of King Djedefre (see plate 2). This stylized hieroglyph denotes a mountain ( )The ancient Egyptians used a very similar sign but with a sun disk between the two peaks. This ( ) denoted the idea of a horizon and a sunrise.

It is thus perhaps relevant to note in passing that Djedefre was the first royal devotee of a new solar cult devised by the priests of Heliopolis, and he was also the first pharaoh to incorporate into his name the word Re (the sun god) and to add Son of Re to his royal titles.[31] His (now) truncated pyramid at Abu Ruwash, which stands some 7 kilometers (about 4 miles) north of the Giza plateau, is thought by some to have been the first sun temple and, like his mountain temple in the Sahara, was also made to face the rising sun due east. Clearly, the new symbolism brought into the royal cult by Djedefre is intensely solar and may have been the stimulus for his successors in the fourth dynasty, such as the pharaohs Khafre and Menkaure, builders of the second and third pyramids at Giza, also to add Re to their names. This new solar cult was even more prominent with the kings of the fifth and sixth dynasties, who built sun temples at Abu Ghorab, a few kilometers south of Giza. Oddly, it was the kings of the sixth dynasty whom Harkhuf and his father, Iry, had so diligently served by finding the way to the kingdom of Yam. At any rate, we will take a closer look at all this in chapter 6.

Meanwhile barely a few years after Carlo Bergmann's discovery of Djedefre Water Mountain, another chance discovery of a similar water mountain was made by a German team of anthropologists, but this time the site was a staggering 700 kilometers (more than 400 miles) south of Dakhla and deep inside Sudan, adjacent to the town of Dongola. To everyone's surprise this other water mountain contained prehistoric rock art perfectly matching that of the mysterious Djedefre Water Mountain. This rock art was studied by the German anthropologist Rudoph Kuper.

[T]he isolated but identical presentation of the water ideograms [near Dongola] more than 700 kilometers south of

> the Dakhla area . . . bears implications for the question of early Egyptian relations with Sudanese Nubia. It suggests a line or a network of communication across the Eastern Sahara as late as the early third millennium BC. . . . The new evidence supports the scenario that even after 3000 BC the Libyan Desert was not completely void of human activity. In its southern part, cattle keepers could survive as late as the second millennium BC. . . . Apparently, the Egyptian Nile Valley and the oases were connected with these regions and farther African destinations beyond by a network of donkey caravan routes crossing southern Egypt. [32]

What Kuper seems to be saying is that prehistoric Black people living in the Egyptian Sahara not only were able to communicate with others as far south as Dongola in Sudan but also were probably still around when the pharaohs of the early dynasties (ca. 2500–2100 BCE) sent their emissaries, such as Harkhuf, into the Sahara. In 1990, German archaeologist G. Burkhard found a small rock mound 30 kilometers (about 19 miles) south of Dakhla that had on it prehistoric petroglyphs of wild animals and also an ancient Egyptian hieroglyphic inscription—"Regnal year 23, the steward Meri he goes up to meet the Oasis Dwellers"[33]—tentatively dated to the sixth dynasty (and thus contemporary with Harkhuf). This discovery prompted Rudolph Kuper to consider the possibility that the ancient Egyptians might have reached the extreme southwest region of the Egyptian Sahara, perhaps as far as Gilf Kebir.[34] The reason for Kuper's uncanny prediction was his awareness of the existence of a hill some 200 kilometers (about 124 miles) southwest of Dakhla known as Abu Ballas Hill (Father of Pots Hill, or Pottery Hill), which had been discovered in 1918 by the British explorer John Ball. Strewn all along its base were hundreds of large clay pots dated to the Old Kingdom (ca. 2500–2100 BCE) as determined by the hieroglyphic engravings found on the hill. What was the purpose of this place? Why did it have all those large clay pots? Count Almasy had visited Abu Ballas Hill in the 1930s, and he had suggested that it was a very ancient water station or supply outpost, a sort of donkey filling station, along a long-forgotten route that may have linked the oasis of Dakhla to Gilf Kebir and perhaps beyond.[35] As it turned out both Almasy and Kuper would be proved correct by none other than the indefatigable Carlo Bergmann.

THE ABU BALLAS TRAIL

The mystery of Abu Ballas Hill was finally solved in 1999 by Carlo Bergmann. In the course of a whole year, from March 1999 to March 2000, Bergmann explored on foot the region southwest of Dakhla oasis and discovered some thirty other water stations with similar large, clay pots set almost equidistant to one another, like a hop-skip-and-jump trail or, more poetically, a string of pearls along a 350-kilometer (217 mile) stretch of desert. The midpoint of this trail was Abu Ballas Hill, and the whole created an almost straight highway from Dakhla to Gilf Kebir. The conclusion was inevitable: this was the long-forgotten ancient caravan trail predicted by Almasy.[36] This discovery amounted to an intellectual explosion for the academics, for here was hard, irrefutable evidence that the pharaohs did after all travel into the deep desert and probably even made contact with the descendants of the prehistoric people who lived there. Further, all this was happening forty-five hundred years before Prince Kemal el Din discovered Gilf Kebir. Here is how the pharaohs did it.

In ancient times the essential commodities for such a trip were, of course, water and food, as well as water and fodder for the beasts of burden. It is well known that the camel was not introduced into Egypt before 500 BCE, so that the only other means of desert transport in the Old Kingdom was the donkey (*Equus asinus*). Harkhuf claimed to have taken three hundred donkeys for his journey to Yam, and donkey caravans are also attested on temple and tomb reliefs as early as the first dynasties. Also, on one of the large clay pots at Abu Ballas there is a drawing of a donkey confirming that this animal had carried the pots and presumably other goods to this location in the desert. The donkey is an excellent desert traveler and can easily carry loads of sixty kilograms (about a hundred thirty pounds) and walk 15 kilometers (about 9 miles) per day and can go three days without water. A fully grown and healthy donkey will need about 2 to 3 liters of water and about 3 kilograms of fodder each day, which together will add 5 to 6 kilograms (about 13 pounds) per day to the load he must carry. A one-way trip from Dakhla to the edge of Gilf Kebir will take a minimum of twenty days and thus will require a total load of 120 kilograms (about 265 pounds) for each donkey, to which we must add another 30 kilograms (about 60 pounds) for the containers that carry the water and food as well as basic traveling equipment plus the food and water for the person leading the donkey (estimated at 50 kilograms—about 110 pounds—per load). Conservatively, then, each donkey must be able to carry at the start of the journey at least 200 kilograms (440 pounds). This, of course, is impossible. A donkey walking at normal pace in such grueling conditions can carry only 60 to 80 kilograms without buckling under the load.

Figure 2.5. Abu Ballas Pottery Hill discovered in 1918. Photographs courtesy of Carlo Bergmann and Mark Borda.

Theoretically, the payload can be reduced by taking extra donkeys, but there are an optimum number of donkeys for the trip, because each extra donkey will also require water and food. The optimum number of donkeys per person is three to four. Sharing the load makes the total load for each about 185 kilograms, which is still not possible for a donkey to carry. It should be clear, then, that in order to undertake this journey, the donkey can start off with a load of only 60 to 80 kilograms, and then, when the water and food are used up, there must be refueling stations along the way—at least two spread equidistant along the way to Gilf Kebir. This assessment explains the need for the large Abu Ballas Hill watering station and also another large one that was discovered by Carlo Bergmann, which he named Muhattah Jaqub (Jacob's Station), located between Dakhla oasis and Abu Ballas Hill. These principal watering stations had to be kept fully supplied with water and food when a donkey caravan expedition was planned, which also explains the need for the thirty small stations that Bergmann discovered in between. In other words, the small stations along the trail were used only for the resupply of the Muhattah Jaqub and Abu Ballas Hill main stations. It was these last two that serviced the caravans and ensured that there was a supply of water and food all the way to the final destination. "But what was the final destination of the caravans?" asked the anthropologist Frank Förster.

> Certainly not Gilf Kebir. The nearest places with permanent water are the Kufra Oasis in modern Libya some 350 km [more than 200 miles] to the northwest of the eastern fringes of the southern Gilf Kebir, and Gebel Uwainat some 200 km [about 124 miles] to the southwest. Kufra, however, surrounded by seas of sand is rather isolated. . . . Therefore, and for other reasons, it is to be assumed that the next leg of the route led towards Gebel Uwainat, the island-like most elevated feature in the whole of the eastern Sahara, which is provided with a number of rain-fed wells at its foot (in Arabic, *Uwainat* means "the small fountains"). From here it would be possible to reach more southern regions in the territory of modern Sudan or Chad. To date, however, no evidence has been found in the Gebel Uwainat, nor in the Gilf Kebir proper, that attests to an Egyptian presence there.[37]

The German anthropologists Stefan Kröpelin and Rudolph Kuper had the same hunch as Förster, namely that the Abu Ballas Trail went on beyond Gilf Kebir, perhaps to Jebel Uwainat and also even beyond to Chad. "Its [the Abu Ballas Trails] final destination is still unknown . . . the nearest locality with permanent ground water lies at distances of 600 kilometers [373 miles] . . . in Jebel Uwainat, from where the trail might have continued to the ecologically superlative Ennedi Plateau or the outstanding lake region of Ounianga in Northeast Chad."[38]

Förster, Kröpelin, and Kuper wrote these words in early 2007. Little did they know that their hunch about Jebel Uwainat being a farther destination along the trail would be confirmed in just a few months. Such are the strange laws of synchronicity in human lives.

THE EGYPTIAN TEACHER AND THE MALTESE BUSINESSMAN

Mahmoud Marai is an Egyptian chemistry lecturer who, like Carlo Bergmann, dropped his career in the classroom for a more adventurous career in the desert. He set up a tour-operating business, taking tourists and adventurers into the deep desert, eventually specializing in trips dedicated to exploration. Mahmoud's infatuation with the desert began when he was stationed at the oasis of Siwa during his military service. There, roaming the golden dunes at the edge of the Great Sand Sea, he was hit by the explorer's bug, and his experience with the desert was love at first sight. Mahmoud just had to become involved with its barren beauty, its haunting and alluring isolation, and, of course, its many mysteries. Like others before him, he dreamed of finding the legendary lost oasis of Zarzora and going to places that were still unexplored. This strange pull that the desert has on some people is not uncommon. There is an inexplicable attraction to being alone in its vast emptiness where earth and sky seem to meet and become one. Somehow, the isolation from human habitation brings us closer to the essence of our humanity. There is an old Arab saying that God lives in the desert. To put it slightly differently, it feels as if it is not us but our soul that is alive when we roam the open desert, for it provokes a strange and very strong sensation that God is standing near us when we are alone in its vastness.

At any rate, Marai's enthusiasm for daring and challenging desert trips attracted the attention of many explorers. In the winter of 2007 a Maltese businessman, Mark Borda, hired Mahmoud Marai for a desert trek[39] to Uwainat. The permits for this expedition were issued via Mahmoud Marai as a registered tour operator by the Ministry of Interior and the Egyptian military authorities, who are responsible for the safety of travelers and tours in the Western Desert. Borda and Marai had met the previous year through the intermediary of Carlo Bergmann. Borda's objective was to search unexplored areas for anything that might be of scientific interest to scholars of geology, botany, archaeology, and anthropology. By carefully studying satellite imagery before the trip, Borda had drawn up an extensive list of targets. Upon his arrival at Jebel Uwainat, Borda immediately set about the task of surveying these targets systematically, very often with Marai accompanying him on his treks. They combed many areas in the lower slopes, wadis, and plateaus mainly southeast of the Uwainat massif. Each day they trekked about 15 to 20 kilometers (9 to 12 miles), checking every nook, crack, and cave they encountered. This method paid off, and they found the locations of dozens of unreported prehistoric works of art.

PHARAONIC INSCRIPTIONS! A CARTOUCHE OF A KING!

By November 27, Marai and Borda had already been walking and searching for nine days. On that day, just as they were about to arrive back at camp for lunch, Borda scanned with his powerful binoculars the last remaining section of boulders that lay strewn on a slope. They were in a region at the southern rim of Jebel Uwainat—which is some 50 kilometers (about 31 miles) into Sudanese territory—an area into which it is dangerous to venture. (In September 2008 a group of Italian tourists was kidnapped at Jebel Uwainat by rebels, and they endured a two-week ordeal before they were freed after a gunfight between the rebels and the Egyptian military.) As Borda panned with his binoculars, he suddenly saw an unmistakable shape on the surface of one of the larger boulders some 100 meters (about 328 feet) from where he stood. It was a shape that he had seen many times before—but only hundreds of kilometers from Jebel Uwainat.

He exclaimed to Marai in disbelief, "There is a pharaonic cartouche on that boulder!" As he moved closer, focusing his eyepiece with growing excitement, he began to see hieroglyphic inscriptions inside and outside the cartouche (see plate 3). The two men could barely contain their excitement, for there it was, after decades of speculation, incontestable evidence that the ancient Egyptians managed to reach this remote place after all! The whole geography of ancient Egypt suddenly changed before their eyes. They immediately took dozens of digital photographs and carefully recorded the coordinates of the location with GPS. After leaving Jebel Uwainat, Borda also decided to check various prominent hills and rocky outcrops and managed to discover a magnificent cave with exquisite prehistoric art in a region previously considered void of such work. The images were not engraved but painted in bright colors. There were scenes showing slender Black men and women tending cattle, performing daily chores, and dancing and acting out rituals. The details and colors were so vivid that it was difficult to accept that they were thousands of years old. These works and the pharaonic inscriptions were by far more than Marai and Borda had dreamed of finding. Now they could return to Cairo with this historical trophy and an amazing story to tell.

Upon their return, Mark Borda immediately flew to London to get a quick translation of the Uwainat Inscriptions, as they are now known. At the Institute of Archaeology, University College London, Borda showed the photographs to Maltese Egyptologist Aloisia de Trafford and British ancient languages specialist Joe Clayton of Birkbeck College. We

can imagine how these scholars felt as they read the two lines of hieroglyphs, and their bewilderment and excitement upon seeing the words *land of Yam* in the ancient text . . . even more because, by a strange coincidence, Clayton had written a thesis on Yam.

PHARAOH MENTUHOTEP'S ENVOY TO YAM

The final translation of the Uwainat Inscriptions was a joint effort between Joe Clayton and Aloisia de Trafford, and their study and conclusions were published in an article coauthored with Borda in the July 2008 issue of the journal *Sahara*.[40] They refrained from giving the exact location of the inscriptions for fear of tourist guides taking clients there. The inscriptions are rather faint and cannot be seen from the plains below. Fate would have it that Mark Borda happened to aim his binoculars in that precise direction, a visual lucky turn of the spade (although, as Borda later explained to us, he quite methodically and thoroughly surveyed all likely surfaces in targeted areas, and the inscription is located on a conspicuous boulder that would have been difficult to overlook). The inscriptions form a rough rectangle 0.74 by 0.84 meter (about 29 by 33 inches). The left portion of the rectangle shows a king sitting on a throne under a canopy opposite a large cartouche bearing his name. Above and below the king's cartouche is written his royal title. The right portion of the rectangle has two lines of hieroglyphs, and beneath each there is a drawing of a man making offerings. Here is the translation by Clayton and de Trafford.

(Left side)
Son of Re, Mentuhotep [inside the cartouche]
King of Upper and Lower Egypt [above cartouche]
Horus living Forever [below cartouche]

(Right side)
Yam bringing incense [upper line]
[images: man kneeling, holding a bowl; another man lying face down, holding a bowl?]
Tekhebet bringing . . . [lower line]
[image: man kneeling, presenting a mountain goat]

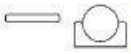
Clayton and de Trafford dated the inscriptions from the Middle Kingdom ca. 2000 BCE. This is, in any case, confirmed by the name of the king as well as the horizontal orientation of the hieroglyphs. The two proposed that the whole motif means that people from Yam and also from Tekhebet (a place of unknown location and, oddly, not mentioned in any other ancient Egyptian texts) came here to Uwainat to rendezvous with an Egyptian delegation sent by King Mentuhotep, probably Mentuhotep II, to present gifts to the pharaoh and also trade with his envoy. According to Clayton, de Trafford, and Borda:

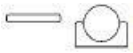
> This new find in Uwainat adds another startling piece to this puzzle by revealing evidence for Egypt's relations with two foreign lands and raises the possibility that these lands may have been located in sub-Saharan Africa, either south or southwest of Jebel Uwainat, possibly hundreds of kilometers further west of the Nile than previously thought.[41]

Oddly, Clayton, de Trafford, and Borda do not mention the Tibesti-Ennedi highlands in northern Chad as a possible location of the legendary kingdom of Yam and/or the mysterious kingdom of Tekhebet—although they imply this by suggesting sub-Saharan Africa hundreds of kilometers south or southwest of Uwainat. This can be only either Sudan (south of Uwainat) or the Tibesti-Ennedi highlands in northern Chad (southwest of Uwainat). The latter are perhaps the most likely and most obvious place. Clayton, de Trafford, and Borda also avoided speaking of the Tebu or Goran people who originally came from the Tibesti Mountains, even though they presumably knew that Ahmed Hassanein had encountered a group of them at Jebel Uwainat in 1923. Although no one can tell for sure how long ago these black-skinned people inhabited the Tibesti-Ennedi highlands, these areas have an abundance of rock art similar to Uwainat that suggests a prehistoric origin. Today some three hundred fifty thousand Tebu still inhabit the Tibesti Mountains, although they have now converted to Islam and therefore no longer live by their old ways. It is highly likely that prehistoric rock art of the Tibesti-Ennedi highlands and the art found at Uwainat have a common origin. It is also very likely that the Tibesti-Ennedi highlands were the final destination of the Abu Ballas Trail. Surely, then, an expedition starting from Uwainat and heading to the Tibesti highlands would be the next logical step in the search for the fabled Land of Yam or Tekhebet. We

will return to this intriguing issue in chapter 5. Meanwhile, we must examine the Uwainat Inscriptions regarding another issue, which was either not noticed or deemed unimportant by Clayton and de Trafford. This involves the form of the writing of the words Yam and Tekhebet. In both names is presented the same ideogram ( ), which is usually translated as "hill land" or "foreign land" (that is, a place outside Egypt).

Although these translations are basically correct, we must now consider them alongside the quasi-similar ideogram of "water mountain" that is found at Abu Ballas Hill and Muhattah Jaqub (the two main water refueling stations between Dakhla and Uwainat). These main water stations can hardly be described as mountains: Abu Ballas Hill is only 30 meters (about 98 feet) high, and Muhattah Jaqub is barely 25 meters (82 feet) high. On the other hand, the Tibesti-Ennedi highlands have the tallest mountains in the Sahara (3,450 meters; about 11,320 feet), and they are known to receive 120 millimeters (about 5 inches) of rain each year. These highlands in Chad, which are directly southwest of Jebel Uwainat and which would define an extension of the Abu Ballas Trail, are clearly befitting of the name Water Mountain.

The ideogram for "mountain" is a two-peaked mound ( ), but we have seen that when a circle (solar disk) is placed between the two peaks ( ) it denotes the idea of "horizon," known as *akhet* in ancient Egyptian. Now the sign to denote "land" is a flattened ellipse ( ), so when it is combined with the akhet sign () the meaning is "land of the horizon." Furthermore, by adding the sign for "people" ( ) the ideograms denote "the people of the land of the horizon," or, more simply, "the horizon dwellers."

We can now recall that King Pepi II, in his letter to Harkhuf, uses the word *akhet* in connection to the land of Yam so that he refers to it as *ta-akhet-iu* (literally, "the people of the land of akhet"). Although many Egyptologists also translate this as "the horizon dwellers," this is not actually correct, because in the letter of Pepi II, the word *ta-akhet* (the land of Akhet) is not written with the signs(), but with the combination of four signs: (1) crested ibis, (2) circle, (3) half circle, and (4) flattened ellipse ( ). Further, it is true that when these four signs are combined, they produce the phonetic sound *akhet,* but the meaning is quite different. However subtle, this difference provides a vital clue to the whereabouts of Yam. Let us see why.

The crested ibis sign ( ), *akh* in ancient Egyptian, is an ideogram that denotes a supernatural being or entity of light or, more simply, a "light spirit." So when *ta-akhet-iu* (people of the land of Akhet) is written with this *akh* sign coupled with the sign for "land" and the ideogram of three squatting divinities wearing an ostrich feather ( ), we must read it as "land of the akh" or "land of the light spirits," or, simply, "land of spirits." Indeed, both the American Egyptologist Henry Breasted and the British Egyptologist Wallis Budge, in their independent translations of Pepi II's letter to Harkhuf, rendered the term *ta-akhet-iu* as "land of spirits."[42] Even though "spirits" in this context implies inhabitants of a cosmic or imaginary land, the same cannot be said for the land of Yam, which is a geographical reality somewhere southwest of Egypt. Could the akh people also mean "ancestor spirits"? If so, who were these mysterious people whom Pepi II claimed populated the kingdom of Yam?

A detailed study of the letter of Pepi II was made by the French Egyptologist and philologist Charles Kuentz,[43] who reminds us that in Egyptian hieroglyphs the general idea of a divinity or spirit is given by the sign of a human figure donning the typical tress beard and squatting ( ). Yet this was not the case in Harkhuf 's time, when a different sign—the falcon on a standard ( )—was used to denote "divinity." Thus, the sign used in the letter of Pepi II as the ideogram in "land of the akh/spirits" ( ) must therefore mean something else—something that should fit this geographical context of the region. One of Kuentz's colleagues, the German philologist A. Wiedemann, noted that this sign ( ) appears in the Pyramid Texts to denote an African people. This is also confirmed by Kuentz, who wrote: "The determinative which is placed *after* , denotes in the Unas Inscriptions the names of *Negroes.*" [44]

Kuentz also noted that in both the Harkhuf inscriptions and the letter of Pepi II, the names of African peoples are

followed by the same determinative ( ) used in the name for "the people of the Ahket land" (that is, the people of Yam). There can be no doubt, therefore, that these people were regarded as black-skinned. We will discuss this issue in more detail in chapter 5. Meanwhile, let us see what Carlo Bergmann has to say about the newly discovered Uwainat Inscriptions of Marai and Borda.

THE ROAD TO YAM AND TEKHEBET

Bergmann agreed with the Egyptologists who studied the Uwainat Inscriptions: they revealed two geographical locations, Yam and Tekhebet. Here is what he says of the Yam location:

> . . . [I]ts geographical position has been misleadingly assigned to a "location between the first and second cataracts . . . further south than . . . Tumas, most likely also west of the Nile or . . . on either side of it . . . and south of the oases.[45] One reason for this misconception may be that, due to their social backgrounds, which are mainly upper or upper middle class, Egyptologists have for a century confused their own physically exhausting experiences in this region with the fitness levels of the ancients (e.g., Harkhuf or Weni and their followers) and have considerably underestimated the abilities of these people to travel to far away destinations even under unfavourable environmental conditions.[46]

Bergmann then asserts that the final destination of the Abu Ballas Trail he discovered in 1999,

> . . . continues from Gebel Uweinat further to the southwest [a fact that] is already indicated by the geographical position of the Mentuhotep II inscription site which is located on the south of Gebel Uweinat. Where does it lead to? Most probably to Yam and/ or to Tekhebet! Although it is a prominent *muhattah* [water station] along the route, the pottery hill of Abu Ballas, from which the trail gets its name, must be viewed as just one amongst many of the road's way [water] stations. So in the light of the new discoveries, the current name of the ancient road is neither appropriate nor accurate. In fact, it has definitely become obsolete. Therefore, a more suitable name is suggested: "The Road to Yam and Tekhebet."[47]

With all this in mind, we must now return to Nabta Playa and review in greater detail what the astronomer Kim Malville discovered there. This is crucial to our investigation, because much hinges—indeed, perhaps everything hinges—on his interpretation of the alignments of the megaliths that are found there.

3

STONEHENGE IN THE SAHARA

For the production of man a different apprenticeship was needed to sharpen the wits and quicken the higher manifestations of intellect—a more open veldt country where competition was keener between swiftness and stealth, and where adroitness of thinking and movement played a preponderating role in the preservation of the species.

RAYMOND DART, AUSTRALOPITHECUS AFRICANUS, *THE MAN-APE OF SOUTH AFRICA*

Ancient Stonehenge-style stones spotted in Egypt's Sahara Desert are the oldest megaliths yet discovered and probably served as both calendar and temple, researchers said on Wednesday.

REUTERS, CABLE NEWS NETWORK, APRIL 2, 1998

SAHARA CLIMATE CYCLES: ANOTHER LINK TO THE STARS?

Before we look more closely at the initial discoveries at Nabta Playa, we must review the current knowledge of climate changes in the Sahara. In this process, we will see how yet another intriguing piece to the puzzle of early human's intimate association with the heavens links to Nabta Playa.

The climate in the Egyptian Sahara is harsh, sometimes even violent. The first night of our April 2008 expedition to Uwainat (told in more detail in chapter 5) was spent on an elevated pass somewhere in the deep, open desert. It was strangely cold at night, considering the extreme heat of daytime, and we shivered under our many layers of covers—from our cotton underwear to the padded sleeping bags—as the temperature plummeted to almost freezing during the late hours of the night. The reason for such huge temperature swings from day to night is due to the almost lunarlike conditions of the landscape and cloudless sky. The sun blazes in daytime, but after sunset the heat begins to whoosh out into space, sending the thermometer down toward the zero-degrees-centigrade mark. From this lack of clouds also comes the hyperaridity of the region, which is considered by climatologists as the driest on Earth. In deserts such as California's Death Valley there is some life—sparse plants, cacti, insects, lizards, occasional foxes, and even coyotes—but in the Egyptian Sahara, especially around places such as Nabta Playa, there seems to be no life at all. There are no plants, no animals, not even insects—only sand and rocks, blowing dust, drifting sand dunes, fossils, loose pebbles and compacted desert pavement, loose boulders, and bedrock outcrops. In other words, the deep Egyptian Sahara is the location on Earth most like the Martian landscape.

But it was not always so. In November 1981, the NASA space shuttle *Columbia* carried a radar-imaging camera from the Jet Propulsion Laboratory that was designed to view through the sands of the Sahara and "see" what was beneath. When the radar camera was trained on the Egyptian Sahara, it picked up the contours of dried-out ancient rivers and lakes beneath the sands.[1] This discovery jumpstarted a revolution in our understanding of the drastic climate changes of the ancient Sahara. We now know that the long-term climate of the Sahara has undergone violent swings.

Around 12,000 BCE, Earth's sea level rose suddenly more than 20 meters (about 66 feet) in less than two hundred years.[2] This was the direct result of catastrophic glacial melting that heralded the beginning of an eight-thousand-year period scientists call the end of the last ice age, when sea levels rose 120 meters (almost 400 feet) essentially to the level they are today. The Mediterranean Sea also rose, causing the climate of the Sahara to fluctuate and change. Around 9000 BCE the monsoon rains moved north over what is now southwestern Egypt,[3] drawn up possibly by low pressure over the collapsing ice sheets in the distant north.[4] This ended a protracted dry period and brought in a humid period congenial to human and animal existence. Not surprisingly, soon thereafter the earliest human artifacts appear in the sediments at Nabta Playa. These sediments, which archaeologists are still digging through today, lie in and around the ancient *playa,* or seasonal lake (now permanently dry), and on top of much more ancient bedrock.

The surface of the now-covered bedrock was scoured by constant winds during many thousands of years of dry periods leading up to 9000 BCE. An area of softer bedrock was scoured more deeply by the winds, which created the depression that filled with water every summer season to become the playa during the monsoon season. This lasted to around 3500 BCE, after which the region became the hot, hyperdry place that it is today. The last humid period in the Egyptian Sahara, which lasted from about 9000 BCE to 3500 BCE, seems also to have ended abruptly. Yet scientists also know that there have been several humid periods before this last one. Paleoclimatologists are finding that humid or wet periods in the Sahara occur with curious regularity, which suggests that these periods might be linked to Earth's cyclical geological changes. Paleoceanographer and marine geologist Peter B. deMenocal studied sediment cores from the eastern Atlantic Ocean to measure the past climate of the Sahara. These sediments, which were originally created by wind-carried dust and sand that then settled to the bottom of the ocean to form layers, act as graduations for measuring climate changes over long periods of time in the same way that rings in tree trunks can tell us of annual weather variations. The phases of the humid periods that deMenocal found in the ocean sediments matched those that the geologists found in the sediment layers at Nabta Playa. DeMenocal was able to show that the humid Sahara periods occurred regularly, about every twenty thousand years, and, furthermore, that they always began and ended suddenly. According to deMenocal, the cause of these sudden climate fluctuations from humid to dry were linked to the cyclical changes of Earth's motion with respect to the fixed stars.[5]

The basis of deMenocal's research relating climatic changes to the fixed stars began in 1920. Interestingly, in that same year Ahmed Hassanein and Rosita Forbes undertook their fateful expedition to the Kufra oasis (which eventually led to the discovery, a few years later, of the massifs of Jebel Uwainat and Gilf Kebir), and in that year the Serbian mathematician Milutin Milankovitch (1879–1958) published his controversial paper that would become a foundation in the science of climate change.[6] The Milankovitch Curve, as his theory is known, was based on an elegant and simple notion: the small, gradual, annual changes in Earth's orbit around the sun as well as the spin of its axis when considered over many thousands of years will create sizeable recurring cycles causing Earth to receive sometimes more, sometimes less light and heat from the sun, which will cause significant climate changes. These changes are the result of three phenomena of Earth's movements: *precession, obliquity,* and *eccentricity.*

1. Precession is a gyrating motion of Earth's axis, which causes the planet to wobble like a spinning top, making a complete cycle every twenty-six thousand years or so.
2. Obliquity is the angle of tilt that Earth's axis makes with the plane of its orbit around the sun. This angle moves up and down in a slow cycle of about forty-one thousand years, known as the obliquity of the ecliptic. Today the angle is 23.4 degrees, but, for example, in 5000 BCE it was about 24.1 degrees. Like the precession cycle, astrophysicists today can calculate with a great deal of accuracy exact changes in past and future obliquity.[7]
3. Eccentricity is the elongatedness (that is, the *perihelion* and *aphelion*) of Earth's elliptical orbit around the sun, which changes in a complex cycle of about one hundred thousand years.[*4]

Precession and the Zodiacal Belt

The sun at the equinoxes (March 21 and September 22) is located in the sky against a backdrop of a particular group of stars or constellations that lie along the so-called zodiacal belt. Every year the position of the sun along the zodiacal belt at the equinoxes moves, or *precesses,* a tiny amount so that, in about twenty-six thousand years, the sun makes a complete cycle around the entire zodiac. Although the precise number of years per each full precession cycle always changes a bit, astrophysicists today can calculate the duration of precessional cycles, past and future, with a great deal of accuracy.[8]

These three effects—precession, obliquity, and eccentricity—when taken together, cause long-term climate change every twenty thousand to twenty-six thousand years—such as, for example, the great ice ages known to have occurred in

the distant past. Around ten thousand years from now, Earth will be closest to the sun in midsummer, as it was about ten thousand years ago. This approximate twenty thousand–year perihelion cycle is caused essentially by the precession of the equinox cycle, and it is shortened somewhat by the change in the eccentricity cycle.

This brings us back to Peter deMenocal, for while studying the sediment layers of the eastern Atlantic Ocean bed, he found that specifically in the Sahara region the climate had switched from wet to dry every twenty thousand years or so over hundreds of thousands of years, and that such switches had taken place quite suddenly. Searching for the causes of these sudden switches, it occurred to deMenocal that the Milankovitch Cycle matched very well the wet-dry cycle.[9] DeMenocal found that the most recent switch from wet to dry occurred around 3500 BCE[10] in a time frame that could be "felt within one lifetime."[11] Let us immediately highlight the fact that 3500 BC is when, according to anthropologists, the prehistoric people of Nabta Playa abandoned their ceremonial site and departed from the Sahara . . . and also when, according to Egyptologists the predynastic phase of the ancient Egyptian civilization is supposed to have begun.

TRACKING THE STARS

Living all their lives in the open desert under the clear, cloudless sky, the prehistoric people of the Sahara were highly tuned to changes in the position of the celestial bodies, and the evidence at Nabta Playa shows that they were not only aware of the long-term motion of precession but also that they must have placed great importance on this stellar cycle, because it seemed to affect the climate of the Sahara and, consequently, their ability to survive in this region that depended so much on suitable seasonal wet conditions.

We are fully aware, of course, that scholars and historians of astronomy attribute the knowledge of precession—and even the awareness of it—not to ancient cultures, but rather to the Greeks when Hipparchus of Nicaea supposedly discovered this phenomenon in 120 BCE. As we will see in chapter 6, however, this consensus no longer stands to close scrutiny, and the new evidence shows, if not proves, that the ancient pre-Hellenic cultures were aware of precession and may even have recorded its long effect in the astronomical alignments of their megalithic monuments. To put it more bluntly, Hipparchus did not discover precession; he *rediscovered* it. It is now a fact and not a theory that humid periods occurred every twenty thousand years or so during the past two hundred thousand years, which directly affected the movements and the culture of the people living in the Egyptian Sahara region. It is also a fact and not a theory that these humid periods were directly linked to precession and the apparent displacement of the stars during these twenty thousand years or so. In addition, it is a fact that the Sahara in Egypt is now generally regarded by paleoanthropologists as one of the crucibles, indeed if not the principal crucible, of civilization.

Is it possible, then, that the ancient megalith builders of Nabta Playa somehow knew that there was a correlation between the cycle of the climate and the cycle of the stars? It may seem to us that this is entirely possible for a people that lived for millennia in a region where the conditions forced them to perform daily and nightly observations of the sun and stars and develop a great knowledge of the celestial cycles and, eventually, incorporate this knowledge into the ceremonial complexes at Nabta Playa.

TEXTUAL EVIDENCE?

A curious verse from the Qur'an speaks of a primeval mind coping with climate changes over the millennia: "And [in] the variation of the night and the day, and [in] what Allah sends down of sustenance from the cloud, then gives life thereby to the earth after its death, and [in] the changing of the winds, there are signs for a people who understand (45:5)."[12]

Although we cannot assume that ancient religious scriptures such as the one cited here can be taken as evidence of knowledge of precession and climatic changes by ancient people, they may be faint echoes of ancient memories that eventually found their way into religious records in this same region of the world. Another such example comes from the Russian mystic G. I. Gurdjieff, whose esoteric teachings attracted a wide following in Europe in the early part of the twentieth century. Gurdjieff journeyed extensively in Egypt, and he claimed that much of the inspiration for his teachings came from what he saw on a secret and very ancient map of "pre-sands Egypt" that he discovered in a remote Asian monastery. This map showed that the Egyptian Sahara was a lush and humid environment in very remote times.[13] Of course, such stories cannot be used to bolster the scientific argument for ancient knowledge of precession and cyclical climate changes in the Sahara, but perhaps we are now able to corroborate such stories with modern science. This is,

indeed, one of the main objectives of our research: to show where this evidence is to be found and how to interpret it.

We start with a media event that stunned the academic community.

CNN: "SAHARA STONEHENGE!"

On April 2, 1998, the international media reported the news that "ancient Stonehenge-style stones [were] spotted in Egypt's Sahara desert."[14] In their report, CNN showed a graphic image of Egypt with huge stones placed on the southeast quadrant of the country. Needless to say, this was a gross exaggeration, because the actual size of each of those particular stones is no more than 1 meter (about 3 feet). The original source of the reports was a press release from the University of Colorado, which was carefully timed to coordinate with a letter published that same day in the prestigious science journal *Nature* titled "Megaliths and Neolithic Astronomy in Southern Egypt" and written by astronomer J. McKim Malville and anthropologists Fred Wendorf and Ali Majar of the CPE.[15]

Although the findings at Nabta Playa were worthy of international attention and respect, this sort of media sensationalism was misleading and confused the public. The impression given in the media prompted by the press release and the *Nature* letter was of a giant Stonehenge in the Sahara. When people eventually found out that the stones were much smaller and that they formed a rough circle only a few meters in diameter, there was general disappointment, and many people eventually lost interest. Furthermore, the letter in *Nature* contained some errors that were uncharacteristic for such a high-profile journal, as well as some significant omissions that would later make matters worse. All in all, the comparison to Stonehenge was a crude metaphor and amounted to a stillbirth for an otherwise very important discovery. In fact, it may have directly contributed to if not explained why the Egyptian authorities paid little heed to this important ancient artifact, why it was so mistreated and blantantly neglected by those who worked there, and why it was ultimately dismantled and taken away to a museum yard in Aswan (see appendix 3).

At any rate, most of the excitement on April 2, 1998, centered on the announcement of the discovery of a stone circle that was made with small stones that were each about 1 meter in height and that were placed in a ring 4 meters (about 13 feet) across. It was labeled the Calendar Circle by Fred Wendorf and his team. In reality, Wendorf and his team had known of the existence of this circle from the time they found the site of Nabta Playa in 1973, but nothing much was done about it until 1992, when the circle was reconstructed to its original form by Dr. Nieves Zedeño, an anthropologist from the University of Arizona, and her colleague Dr. Alex Applegate, who had recently joined the CPE. [16] Yet it took a further six years before the world was told about it. Oddly, it was the Applegate-Zedeño reconstruction map of the Calendar Circle that was used by Wendorf and Malville and the rest of the authors in the 1998 *Nature* letter. Also, even more oddly, in this letter, the authors give an interpretation of only four stones in the circle and totally ignore the possible meanings of the other stones, especially those within the circle itself. Nevertheless, this limited information was enough to spur the "older than Stonehenge" claim and to ensure a massive media reaction.

Still, why did it take twenty-five years to inform the public of the oldest astronomical site in the world? What really happened to the stone circle between 1973 and 1998? First, we must emphasize that the Combined Prehistoric Expedition (CPE) was composed essentially of field anthropologists, archaeologists, and geologists, most of whom were unfamiliar with astronomy or, perhaps, simply reluctant to apply this science to their own professions. Thus, it took them from 1973 to 1992 to realize that the stone circle might be some sort of calendrical device. After the circle was reconstructed by Applegate and Zedeño in 1992, it quickly became apparent that an important feature of the circle were the so-called gates that created two alignments pointing to the rising sun at the summer solstice and also to the north-south meridian (which are both indicative of observation of the sun at important times of the year). At this stage, CPE director Fred Wendorf invited the American archaeoastronomer Kim Malville to come to Nabta Playa for the 1997 winter excavation season. Malville spent a few days at Nabta Playa in order to study the alignments of the stone circle and other features of the ceremonial complex, which resulted in the publication of the 1998 letter in *Nature.* In view of the importance of the claims made in *Nature* and the strong reputation and influence of *Nature,* we must now review in some detail what was reported in the letter.

GATES OF THE SUN

In the *Nature* letter, Malville and the other authors highlighted two sets of gates in the outer ring of stones of the Calendar Circle and deduced that these were deliberately intended to designate important directions: one set was directed north-south, clearly a cardinal direction; the other was directed northeast, clearly a summer solstice sunrise direction. In

additon, according to Malville and the other authors, “The circle is too small to have functioned as a precise sighting device. The centre lines of the two windows have azimuths of 358Â° and 62Â°. Taking into account refraction, we estimate the azimuth of the first gleam of the summer solstice Sun 6,000 years before the present to have been 63.2Â°, which would have been visible through the slots of the circle.”[17]

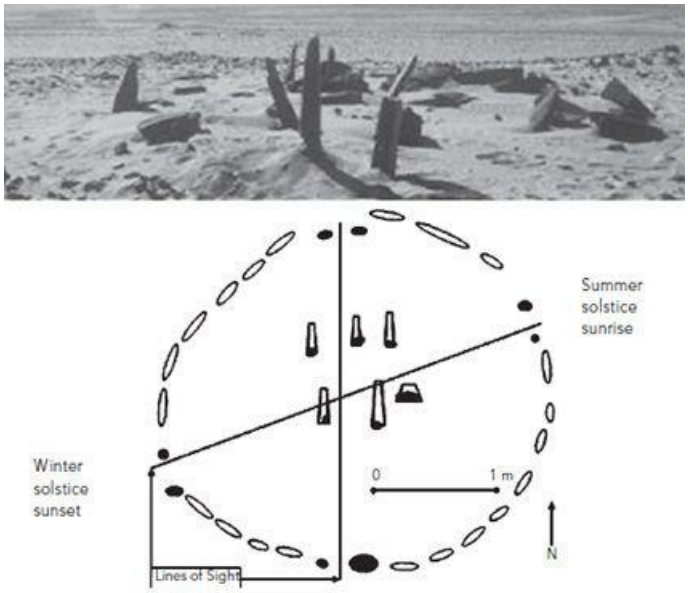


Figure 3.1. Approximate map of Calendar Circle showing the solstice gates and the meridian gates. Upper image is the Calendar Circle in its ruined state in 2008.

Although we can say that the ancient builders intended the circle’s southeast gate to point to the rising sun on the longest day of the year, it is nonetheless an approximate alignment; the width of the gate varies 2 degrees in either direction and thus cannot be used for dating purposes with the sunrise because the changes in Earth obliquity over the past six thousand years is much less than 2 degrees. As a matter of fact, the approximate solstice alignment of the Calendar Circle is as valid today as it was six thousand years ago. It is also an exaggeration to call the stone circle a calendar simply because it has an alignment to the summer solstice. Indeed, neither the solstice gate nor the stone circle as a whole can be used as a calendar in the modern sense of the word. Further, although we, too, call it a Calendar Circle here, it seems that Malville’s Nabta Playa tag of “six-thousand-year-old calendar” was more influenced by the nearby excavations that contained artifacts that could be radiocarbon analyzed and were dated to this epoch than by the astronomical alignments of the stones. Actually, the only real astronomy that can be derived from the 1998 *Nature* letter is that Nabta Playa is located near the Tropic of Cancer, implying that the standing stones would cast no shadows at noon on the summer solstice (June 21), a feature that modern achaeoastronomers often considered as significant to ancient cultures.[18] Thus according to Malville and colleagues, “At this latitude, the Sun crosses the zenith on two days, approximately three weeks before and after the summer solstice. Vertical structures cast no shadows under the zenith Sun, and within the tropics the day of the zenith Sun is often regarded as a significant event.”[19]

Truthfully, the only actual astronomy reported in the *Nature* letter was that a small stone circle had an approximate solstice alignment and stood near the Tropic of Cancer. This fact, on its own, was not extremely impressive. As one prize-winning archaeoastronomer put it recently at the annual meeting of the American Astronomical Society, “you can be a primitive ape man and make a solstice alignment!” implying that scholars should start with the assumption that the people of Nabta Playa were simply primitive brutes. Yet all paleoanthropologists agree that the human brain ten thousand or more years ago was essentially identical to our own brain, and, as professor emeritus Archibald Roy of Glasgow University often remarks, “there were Einsteins and Newtons then,” geniuses who were just as quick-thinking and astute as we are today but who had to apply their intelligence without the science and technology that we have. It is true that setting a few stones in rough alignment to the summer solstice did not require the power of an Enstein or a Newton, so what were the anthropologists of Nabta Playa really so excited about—as the 1998 *Nature* letter clearly implied? Apart from being perhaps the oldest astronomical site in the world, is it possible that something else at Nabta Playa had hinted to them that at the site there was much more there than meets the eye—which they were not yet ready to disclose?

INEXPLICABLE CONSTRUCTIONS

In addition to tumuli tombs of cattle (see chapter 1), the CPE anthropologists also found collections of large, oval-shaped megaliths on top of the playa sediments, which they called complex structures (also see chapter 1). They had hoped that these were the top parts of tombs belonging to high-status individuals or even kings, but when they excavated beneath these complex structures, they were surprised to find not human or animal remains, as they had hoped, but strange sculpted lumps of bedrock some 4 meters (about 13 feet) below the ground. The largest of these complex structures, which the CPE had labeled Complex Structure A, or simply CSA, also contained buried underneath it a huge human-sculpted megalith, which was placed over the sculpted lump of bedrock that lay 4 meters (about 13 feet) under the surface! According to Fred Wendorf and colleagues, in CSA, ". . . [W]e found a sculptured rock, which has some resemblance to a cow. It was standing upright with its base 2 m [about 7 feet] below the surface, and its long axis was oriented a few degrees west of north. The rock had been blocked into place by two smaller slabs. Further beneath it, at a depth of 4 m [about 13 feet], the shaped table (bed) rock had a similar northward orientation."[20]

CSA consisted of a group of megalithic stones laid in oval formation on the surface of the ground. Below this oval structure, some 3 meters (about 10 feet) down, was buried the oddly shaped megalithic sculpture labeled the cow stone by the CPE. Directly beneath this cow stone sculpture there was a large, sculpted lump of bedrock that was still attached to the natural table rock strata that lay under the playa sediment. CSA was clearly the main feature of the whole ceremonial complex, for not only was it the largest megalithic structure at Nabta Playa, but it was also the focal point of several other megalithic stones alignments that had been placed upright in the playa sediments (but most of which people have toppled since). These aligned megaliths averaged 2 by 3 meters (7 by 10 feet) and were placed in rows running more than a kilometer (about 0.6 mile) toward the east and north horizons. They all radiated out of CSA like spokes of a bicycle wheel. The 1998 *Nature* letter gave the precise azimuths of five megalith lines, which seemed to imply some important symbolic meaning, although the CPE offered no suggestion as to what this might be. The only interpretation by Malville and colleagues was that "the megalithic complex may have been an expression of interconnections between the Sun, water, death, and the fertile Earth. . . ."[21]

The *Nature* letter also pointed out that "no star was visible at the north celestial pole during most of the occupation at Nabta"[22] and made no mention of possible stellar orientation for the megalithic alignments. One of the megalithic alignments was reported to have an azimuth of 90.02 degrees, suggesting an incredibly high level of accuracy and knowledge of the cardinal direction east for observations without fine optical instruments.[*5]

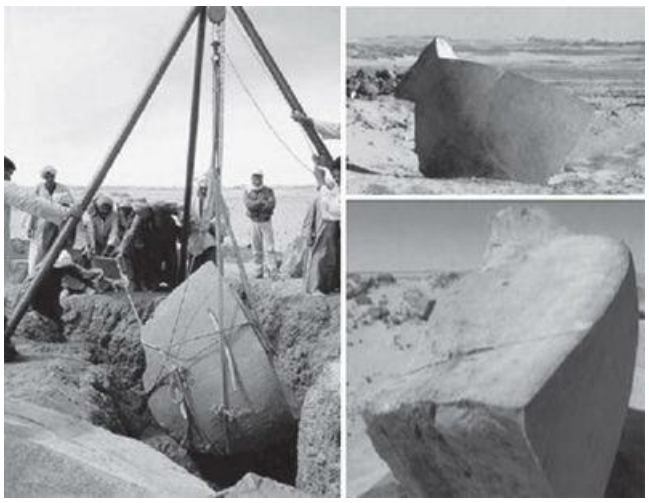


Figure 3.2. Excavation of the cow stone central sculpture from Complex Structure A at Nabta Playa

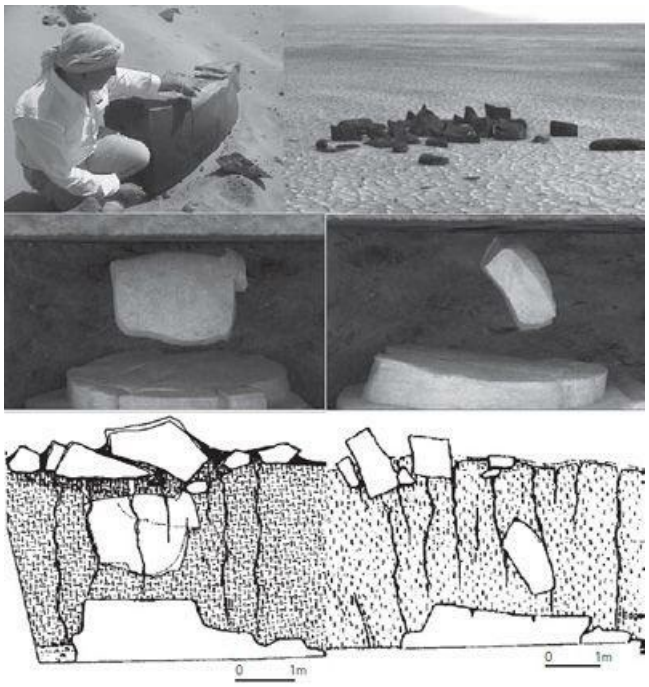


Figure 3.3. Upper left: Thomas Brophy with one of the megaliths that composed the surface of Complex Structure A (CSA). Upper right: Artist's depiction of a Complex Structure surface arrangement of megaliths. Middle left: Artist's depiction of CSA as it was before excavation, looking west, as if seeing through the sediments. The cow stone sculpture is suspended in the sediments between the surface of the ground (top of image) and the bedrock sculpture (bottom of image). Middle right: CSA viewed looking north. Bottom: Excavators' line drawing of CSA, cow stone sculpture, and bedrock sculpture, looking west (at left) and looking north (at right). (Artist depictions by Doug Thompson for Carmen Boulter. Line drawings courtesy of the CPE, adapted from Wendorf and Schild eds., *Holocene Settlement of the Egyptian Sahara,* vol. 1, "The Complex Structures or Shrines" by Fred Wendorf and Halina Krolik, p. 509.)

We were a bit apprehensive of the many inconsistencies in the 1998 *Nature* letter and also wondered why no suggestion was made for any possible alignments to stars. As it turned out, however, this was to come a few years later from the CPE.[23]

THE 2001 OFFICIAL SITE REPORT: RELUCTANT INTRODUCTION OF THE STARS

In 2001, two years after the *Nature* letter and twenty-five years after the discovery of Nabta Playa itself, the CPE finally published an extensive report of their excavations in book format edited by Fred Wendorf and Romuald Schild. It included the contributions of twenty-two articles by various participants in the archaeological work at Nabta Playa since its discovery.

One article in the book, titled "The Megalithic Alignments," was coauthored by Wendorf and Malville and gave a description of the various megalithic structures—and discussed stellar alignments at Nabta Playa. Indeed, the megalithic alignments that were now declared to have such stellar alignments were all those that radiated from CSA. Seen as a whole, CSA itself was the most elaborate member of a group of about thirty complex structures built in the playa silts and covering an area of about two football fields. This area was located some 2 kilometers (about 1 mile) south of the Calendar Circle and included the rows of megalithic alignments that emanated 2 kilometers from CSA to the northeast and southwest. With stellar alignments now identified at Nabta Playa, the site took on a completely new meaning and importance, which, even at this early stage, suggested there was some deep message—symbolic or practical—that had to be understood and interpreted. Before we investigate this message further, we must first familiarize ourselves in more detail with the thirty or so complex structures at Nabta Playa, which were the subject of another article in the CPE book written by Wendorf and Krolik.[24]

According to this article, each complex structure consisted of a cluster of megaliths arranged in an oval shape that measured some 5 to 7 meters (16 to 23 feet) long and 4 to 6 meters (13 to 20 feet) wide, with the longer axis oriented to a position slightly offset from the north-south meridian. The megaliths in each cluster were either placed on top of the playa silts or had been embedded in it. Some of the stones were still standing at the time of the article, but many have

since fallen. The largest ones were placed in the center of the oval clusters, and although this was not mentioned by Wendorf and Krolik, we noted (when we finally traveled to see the megaliths for ourselves in 2003) that a few of the structures were partially sculpted with strange curves and angles that were clearly made by human hands.[25]

One of the odd aspects of these complex structures was that they were placed above the sculpted lumps of bedrock (about 3 or 4 meters under playa sediments, the exact depths are different for each complex structure). Only one complex structure (CSA) contained in addition a separate "cow stone" sculpture that was hidden about 3 meters (about 10 feet) beneath the ground. Two complex structures were fully excavated, and on another three, only borehole tests were performed—yet this was enough to confirm that all the structures had beneath them sculpted bedrock, and the results also implied that all the remaining twenty-five or so complex structures had been built in the same way. We will later look at the possible meaning of these mysterious complex structures, but meanwhile, let us examine how and when they were built.

The CPE has established that the silt upon which the complex structures were built dates to 5100 BCE. This means that the visible part of these structures (the stone ovals) cannot be older than this date. Yet the bedrock that lies some 4 meters (13 feet) or more beneath the surface is surrounded by sediment that is dated from about 9000 BCE to 5100 BCE, which would indicate that the lumps of bedrock were sculpted by human hands at a time that was much earlier than the manufacture of the oval of stones that we see today on the surface. These sculpted lumps of bedrock are of hard quartzitic sandstone that remained in place after the softer surrounding sandstone was eroded by wind, long before 9000 BCE, and they were sculpted sometime before they were incorporated into the complex structures. How did the ancient builders who constructed the oval of stones on the surface know that deep beneath the spot they had chosen were these strange outcrops of bedrock? Wendorf and Krolik show their bafflement when they write: "How and why the builders of these [complex] structures located the buried bedrocks is not known. They may have used probes or dug pits. . . . Whatever technique was used to find the bedrock, when it was located, a large and deep enough pit was dug to expose the entire circumference of the [bed]rock . . . up to 5 meters [about 16 feet] in diameter at the base and 3.5 m [about 11 feet] or more deep. . . . Dug through heavy silts and clays, the pits required a major effort."[26]

According to Wendorf and Krolik, the ancient builders then sculpted the bedrock and, in at least the case of Complex Structure A (CSA), filled the pit partially; placed another megalithic sculpture, the so-called cow stone; and then filled the pit completely to make it level with playa silts. The final operation was then to make an oval of megaliths on the surface of the silts. We can note, however, another, more natural solution to this mystery:

> Wendorf and Krolik theorize that CSA and thirty nearby similar Complex Structures were all constructed entirely after the sediments were lay down, with the builders locating subsurface bedrock lumps suitable for sculpting using some unknown method for knowing what is under the sand. Given that parts of CSA and the other Complex Structures consist of sculpted bedrock under the playa sediments, it is reasonable to think that something was possibly constructed there before or during the playa sedimentation, and only the final stage of construction occurred at or after the end of the last major humid interphase.[27]

In other words, it is possible that whoever partially sculpted the lumps of bedrock that lie about 4 meters (about 13 feet) below the surface were at Nabta Playa thousands of years before the final stage of the complex structures was completed (that is, before the placement of the oval of stones that lie on the surface of the earth today).

In 2007, after reading our paper ("Satellite Imagery Measures of the Astronomically Aligned Megaliths at Nabta Playa"), Malville, Schild, and Wendorf came to agree with the possibility that the bedrock sculptures of the complex structures were created much earlier than previously thought. Thus, accordingly, they wrote: "How or why the buried table rocks were chosen remains a puzzle. It seems unlikely that the rocks had been found accidentally during excavation for wells, as these were in dunes at the edge of the playa and not in the playa sediments. It is conceivable that these round, large quartzitic lenses were part of the symbolic landscape of the Middle Neolithic and became significant before the establishment of the complex ceremonial centre. Perhaps their locations had been marked by rock cairns before gradual burial by playa sediments."[28]

Not only did Wendorf and his coauthors come around to our way of thinking, but also we made them aware in the paper we published in 2005 of a number of technical errors that the CPE had made in their previous publications.[29] Before reviewing these, let us recall that Complex Structure A was the focal point of a series of megalithic alignments that radiated toward the horizon, and then look at how Wendorf introduced the discovery of these megalithic alignments

with unusual candor.

> The discovery of the first alignment of large stones in 1990 came as a complete surprise. It is not clear why we failed to recognize them previously, or rather why we failed to understand their significance during the first three field seasons at Nabta [1974, 1975, and 1977]. It was not that we did not see them because we did, but they were either regarded as bedrock, or in some instances where it was clear they were not bedrock, regarded as insignificant. Perhaps the most embarrassing failure is the Group A alignment, which appears on one of our earlier published profiles as a somewhat fanciful steep sided hillock, buried under playa sediments. We were so sure it was bedrock that we failed to drill a borehole near the megalith. Our view of the Neolithic societies in the Sahara at that time was that the sites we were excavating represented small bands with simple social systems. Building [such] large stone monuments was not expected among such groups.[30]

Wendorf 's candid words here show that even in the physical sciences there is a tendency to find only what we set out to find and ignore or fail to notice other features that do not fall within our preset objective. In other words, scientists have a tendency to discover what they expect. Important to note, at any rate, is that Wendorf and Malville in "The Megalithic Alignments" finally took notice of the mysterious megalithic alignments and structures and their possible astronomical meaning.

They were in for quite a surprise. In their 2001 report Wendorf and Malville listed no fewer than twenty-five megaliths that were placed in six main alignments toward the horizon. Although most of the megaliths today are toppled and broken, as indicated earlier, originally they stood upright and created impressive lines of sight. They were generally about 2 by 1 meters (about 7 by 3 feet) in height and about 0.4 meter (about 1 foot) thick. The biggest of these megaliths was a massive 3 by 2.5 meters (about 10 by 8 feet) in height and 0.7 meter (about 2.3 feet) thick and is estimated to weigh more than 10 tons. Yet this was by no means the largest block found at Nabta Playa. The largest, although not part of any apparent alignment, was labeled Megalith X-1 by Wendorf and measured 4 by 3.1 meters (about 13 by 10 feet) in height and 0.7 meter (about 2.3 feet) thick and was estimated to weigh nearly 20 tons. Returning to the six megalithic alignments, the astronomer Kim Malville spent some time measuring their latitude and longitude to determine their precise azimuths, and he identified three of them going toward the north and the three others going toward the east.[31]

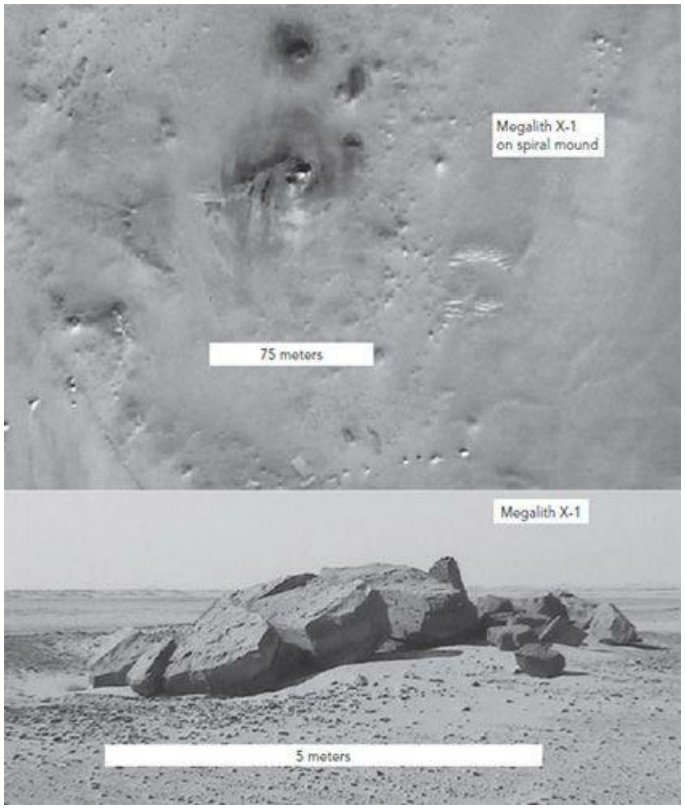


Figure 3.4. Nabta Playa Megalith X-1, shown in the satellite image in the center of an oval hill and large, low, spiral-armed feature. The broken or cut X-1 is on the ground. Scale in the two images is indicated by the lengths of the labeled white bars.

ALIGNMENTS TOWARD THE STARS: WHEN AND WHY?

Malville concluded that the megalithic alignments had been intended to point to the rising place of important stars on the horizon in the late Neolithic period. He proposed that the three alignments going north tracked the star Dubhe at 4742 BCE, at 4423 BCE, and at 4199 BCE. Of the set of three alignments going east, one was aimed at Sirius about 4820 BCE and the two others tracked the stars of Orion's belt at 4176 BCE and 3786 BCE. What Malville had determined, even though he did not spell it out himself, was that the ancient builders were tracking the precessional shift of important stars over several centuries, perhaps even millennia.

At this stage, however, we must quickly point out that though one of the functions of the megalithic alignments was to act as trackers of the changing rising points of stars on the horizon across the epochs, it is important to note that the dates allocated by Malville to the alignments are in error due to the miscalculation of the azimuths made in the 2001 report[32]—errors that have since been corrected.[33] Further, although the 2005 corrected azimuth readings gave much earlier dates for the tracking of the stars, and although Malville agreed on the corrections, he did not then apply those dates but instead proposed a set of different stars to fit his original (incorrect) dates. At this point we and Malville parted ways in the interpretation of these alignments. We chose to retain the original stars proposed by Malville—Dubhe,[*6] Sirius, and those of Orion's belt—for as we will see in chapter 4 these stars no doubt made far more sense to the prehistoric people of Nabta Playa. In addition, chapter 6 shows how this prehistoric star lore was eventually passed on to the ancient Egyptians, who built the pyramids, and how especially the bright star Sirius became the star par excellence of the pharaohs.

4

SIRIUS RISING

We learn from the Pyramid Texts that Orion and Sirius occupied almost as important positions in the king's plans for his after-life as the circumpolar stars.

I. E. S. EDWARDS, *THE PYRAMIDS OF EGYPT*

And He it is Who has made the stars for you that you might follow the right way thereby in the darkness of the land and the sea; truly We have made plain the communications for a people who know.

THE QUR'AN 6:97

The importance of Sirius for the Egyptians lay in the fact that the star's annual appearance on the eastern horizon at dawn heralded the approximate beginning of the Nile's annual inundation which marked the beginning of the agricultural year. . . .

RICHARD WILKINSON,*THE COMPLETE GODS AND GODDESSES OF ANCIENT EGYPT*

CALENDAR CIRCLE REVEALED

Our own investigation of the astronomy of Nabta Playa began immediately after we had seen the 1998 *Nature* letter by the CPE and also the accompanying press release issued by the University of Colorado on behalf of professor Kim Malville. We were intrigued by the so-called Egyptian Stonehenge in the Sahara and the sensational claim that it was the oldest astronomical megalithic site in the world. Looking at the simple diagram and the few photographs of the Calendar Circle, as the CPE now called it, it was quite obvious to us that the much-touted Egyptian Stonehenge was substantially smaller than the famous one in England, but the true importance of this strange artifact is in its age and the information that we can derive from the monument. For example, we can recall that in late 1996 a small meteorite from Mars, which allegedly contained hydrocarbons and tiny globules formed by fossils of tiny primitive bacteria, was found in Antarctica.[1] The photographs published in the press of the unimpressive ping-pong-ball-size rock did not really have an impact on the general public—unlike, for example, the famous radio broadcast of October 30, 1938, when Orson Welles' sonorous voice read an adaption of H. G. Wells' science fiction novel *War of the Worlds,* in which Martians invade Earth and cause panic in several cities in the United States. Thousands mistook Welles' reading for a real news broadcast.

Regarding the Martian meteorite, it was not really its size or shape that could impress us but rather the information it contained, which, if proved true, could completely change our perception of life in the universe and of who we really are. Likewise, the information locked in the arrangement and alignments of the Calendar Circle stones and its partner stone monuments could completely change our views on the origins and racial roots of the world's greatest civilization. The Calendar Circle of Nabta Playa, it turns out, is not an Egyptian Stonehenge but instead more of an Egyptian Mars meteorite with a rather special message for the story of humanity.

What first grabbed attention regarding the Calendar Circle, other than the two sets of gates on the outer ring of the circle reported by the CPE, were the six standing stones (actually two sets of three stones in rows) at the center of the circle. The CPE *Nature* paper focused on the so-called gates, explaining their astronomical alignments toward the summer solstice sunrise and toward the north-south (meridian) cardinal direction. No explanation at all was given for the two sets of standing stones inside the Calendar Circle. These were either ignored by the CPE or deemed unimportant. This seemed very strange, for if the Calendar Circle had meaning to the people who built it, then surely the primary feature of the arrangement—the two rows of stones standing at its center—must also have had meaning to the ancient builders. Perhaps the CPE simply had not been able to discern the meaning of the stones. We decided, therefore, to start our investigation by focusing on these mysterious stones. Our hunch was that they had some astronomical function that

related not only to the gates of the Calendar Circle but also, perhaps, to the whole ceremonial complex at Nabta Playa.

Yet we did not know how best to approach the meaning of these stones. We knew that one of the pitfalls of investigations of ancient cultures is first to entertain preconceived ideas about what their capabilities and knowledge were. We saw in chapter 3 how the CPE made this mistake ragarding the megalithic constructions at Nabta Playa, which they saw as natural outcrops of rock, because they had assumed that "building large stone monuments was not expected among such groups."[2] Further, although the CPE anthropologists did eventually realize their mistake and understood that these megaliths were constructions that had been created by the prehistoric people of Nabta Playa, their preconceived ideas resulted in the delay of the advancement of knowledge by several decades.

How many times has this sort of obstinate blockage occurred in archaeology? Perhaps the most bald-faced one was when, in 1993, Rudolf Gantenbrink, an independent robotics engineer, explored one of the star shafts in the Great Pyramid and discovered at its end a small trap door with handles. "There is nothing behind this door!" cried German Egyptologist Rainer Stadelmann, who was in charge of the exploration. More than seventeen years later, the world is still waiting to know what might be hidden at the end of the star shaft. We were determined not to make the same blunder ourselves.

The *Nature* letter concluded that the Calendar Circle had an astronomical function of some sort. Thus we approached those six stones in its center as a straightforward astronomy puzzle—that is, we determined not to presume to know in advance what the Neolithic people who built it could have been aware of or what they were thinking or why they were arranging the stones as they were. For the purpose of solving the puzzle of the Calendar Circle, we determined simply to consider human-made stones on the ground and astronomy in the sky.[*7]

We decided that if we found a solution to the astronomy puzzle, then we could consider whether it fit in with the rest of the archaeological and anthropological evidence. It occurred to us that the first step toward solving the astronomy puzzle would be to assume that the six upright stones inside the Calendar Circle had been placed in position to work with the astronomical alignments of the gates. In other words, the two rows of central upright stones should somehow have been connected to the summer solstice sunrise and the north-south meridian directions when the Calendar Circle was built. Yet why would the ancient builders place six upright stones inside a circle that marked time with the summer solstice and that marked place with the meridian?

When we look at the Calendar Circle from directly above, the two sets of upright stones inside it appear analogous to the dials of a petrified giant clock. In the same way a police detective may examine the dials of a broken wristwatch or the pointers of a broken compass to determine the time and place of the crime, we decided to examine the two rows of upright stones in the frozen Calendar Circle to determine when and where in the sky the ancient astronomer-priests may have looked when they designed this astronomical stone instrument. What could they have seen on the meridian of the sky during the summer solstice that could be represented by these upright stones? We knew from our previous studies that much later the ancient Egyptians of the nearby Nile Valley paid particular attention to the summer solstice, because it was during this time of year that the annual flooding of the Nile irrigated the land and brought sustenance to the crops. We also knew that this yearly hydraulic miracle was marked by the appearance of three prominent stars at dawn—those we today call Orion's belt. We can recall how the monsoon rains that drenched the Sahara and refilled the dry lakes in midsummer were of vital importance to the prehistoric people of Nabta Playa. In fact the very same monsoon rains also filled the great lakes of central Africa, which were the source of the Nile, and brought the annual flood to Egypt. Could the prehistoric people of Nabta Playa have seen the dawn appearance of Orion's belt as a marker of the annual rains, as did the ancient Egyptians later with the annual Nile's flood? More specifically, could the three stars of Orion's belt be correlated to one of the sets of three stones in the Calendar Circle? The three stars of Orion's belt were equidistance from each other, as were the three upright stones inside the Calendar Circle.[*8]

This was, to say the very least, a tantalizing invitation to see a deliberate correlation between stars and stones. As we began to analyze the possibility, the puzzle of the Calendar Circle astronomy immediately began to yield.

We imagined using the Calendar Circle as an astronomical instrument, and we set our astronomical software to the earliest date possible for it: 4712 BCE, at the latitude of Nabta Playa. This was close to the date that the CPE had allocated to the Calendar Circle by radiocarbon analysis. We then looked at our computer simulation of the ancient sky. We imagined ourselves kneeling on the outside of the Calendar Circle and looking at the summer solstice sunrise through the set of gates that were directed northeast. We then imagined ourselves moving around the Calendar Circle and looking through the other set of gates toward the meridian in the sky. We set our computer screen to look at the south meridian—and there it was, close to the meridian: Orion's belt!

Our hypothesis at this stage was thus that the ancient astronomer-priests of Nabta Playa had designed a device that locked together the summer solstice sunrise and the culmination of Orion's belt for ritualistic purposes and also for the practical purpose of marking the coming of the monsoon rains. Yet could such a hypothesis be scientifically tested? Yes—it could be accomplished by working out at which epoch the pattern of the three stars of Orion's belt would have matched the pattern of the three stones in the Calendar Circle and then comparing this result to the one resulting from radiocarbon and other dating methods. If these dates matched, then the hypothesis would stand. We need not be bogged down here in details regarding how the position of Orion's belt can be worked out with precession calculations. This, in any case, can be verified easily on a home computer equipped with good astronomical software. Any keen observer of the night sky will know that Orion's belt forms a very noticeable *asterism* (small group of stars) in the southern sky. Indeed, so striking is this asterism that it was not only noticed but also used by many ancient cultures in their rituals and mythologies. The asterism is at the center of the great Orion constellation that today dominates the southern sky in the winter months.

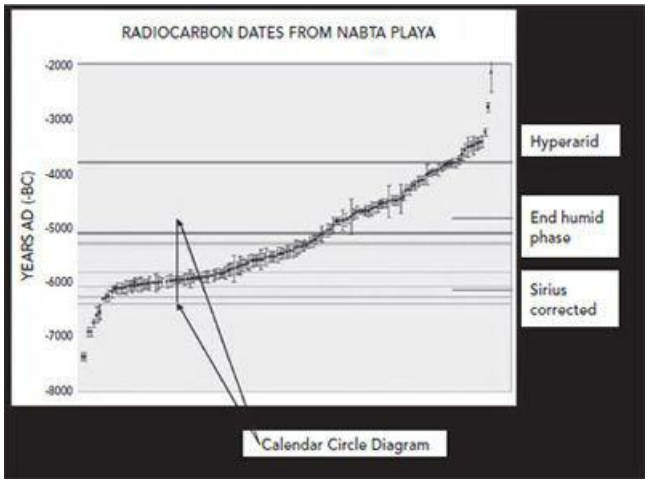


Figure 4.1. Plot of all the radiocarbon dates from Nabta Playa published by the CPE

The current configuration of the constellation was formed about two million years ago[*9] and will remain recognizable in the night sky for the next two million years or so, making it one of the longest observableby-humans constellations, and its familiar pattern was recognized by many ancient people, although these cultures represented it differently. Most often, however, it was respresented as a giant human figure striding across the heavens. Thus, the ancient Egyptians saw Orion as a giant man representing the god of resurrection, Osiris. To the ancient Babylonians, the constellation was Mulsipazianna, the heavenly shepherd. The Greeks saw it as a giant hunter. Even the Bible speaks of Orion and Orion's belt in the books of Job and Amos.[†10] Indeed, on a clear, cloudless night, it is almost impossible not to be drawn to this bright and impressive asterism, especially to the obvious three-star asterism forming the belt—and likely this pull was stronger for the ancient people of the Sahara, who, every night, had the opportunity to watch the stars, unhindered by either obstacles or the light pollution of towns and cities.

Of course, it is important to note that the slow, twenty-sixthousand-year cycle of precession will change over time the angle that the Orion's belt asterism makes with the meridian. If we bear this in mind, it is relatively simple to verify by computer simulation of the sky what the angle of the three stars is relative to the meridian and then match it to that of the three upright stones at the center of the Calendar Circle. What epoch does the circle then represent? The CPE concluded that the Calendar Circle must be dated to about 4800 BCE, because organic matter found nearby was firmly fixed at that date by radiocarbon analysis and other archaeological methods. Clearly, then, it was worth checking the angle of the Orion's belt asterism around 4800 BCE in order to test our hypothesis. There was a hiccup at this point, however: our software went back only to Julian date zero, 4712 BCE.[3]

Scaliger's Julian date counting Method

We note that the commonly used astronomy programs (SkyMapPro and StarryNight) employ approximation methods to calculate the locations of stars. Because they approximate around the current date, they are extremely accurate for any

dates within thousands of years of today, but for extremely ancient or extremely distant future dates their accuracy begins to degrade. The program we used, SkyMapPro, cannot give readings earlier than 4712 BCE because it employs the so-called Julian date counting method, which is based on the Julian period proposed by Joseph Scaliger in 1583. This Julian period is a multiple of three time cycles: the nineteen-year Metonic cycle or synodic lunar cycle, times the twenty-eight-year solar cycle or leap year day counting cycle, times the fifteen-year indiction cycle used for tax accounting in medieval Europe. Scaliger intended his long period count to be useful for unifying the various measures of historical time with which scholars were then struggling, and he figured, interestingly, that 4712 BCE—the last time those three cycles were in their first year together—was a good enough place to start counting for a unified modern calendar system, because that date was earlier than all known historical dates at the time (that is, generally accepted historical dates known to European scholars at the time).

Like many figures in the past who have proposed important advances in knowledge and new ways of thinking about ancient history, he seemed to have ruffled many academic feathers in his time. As one writer on Scaliger puts it, he wanted to "revolutionize perceived ideas of ancient chronology—to show that ancient history is not confined to that of the Greeks and Romans, but also comprises that of the Persians, the Babylonians and the Egyptians . . ."[4] He wanted to push beyond the academically popular Eurocentricnotions of Greeks and Romans being the source of all important modern knowledge in order to include more ancient roots, including sources from Egypt. Scaliger believed that much of the astronomical and calendrical knowledge that we tend to ascribe to discovery by ancient Greeks actually came from earlier Babylonian, Akkadian, and Egyptian sources that were transcribed, translated, and studied by Greek conquerors. That debate—rediscovery versus discovery—continues among scholars. As we will see later in this book, the earliest roots of discovery of that knowledge may keep moving back in time, past those pre-Greek sources toward even the people who built Nabta Playa. It is a curiosity that the dates of the Nabta Playa Calendar Circle turn out to be just a bit earlier than Julian date Zero.

CALENDAR CIRCLE RESOLVED

In order to accurately calculate ancient star locations, we were able to employ some methods related to our own doctoral dissertation work using computers to simulate certain planetary astrophysics motions.[5] We wrote a brief computer program to calculate very ancient star locations using the generally accepted mathematical equations for the long-term motions of Earth.[6] We then tested our method against the SkyMapPro astronomy software as far back in time as it could go in order to verify the accuracy of this method, which turned out to be very precise. Satisfied that we were well within the accuracy required for our purpose, we then examined the angle of the Orion's belt asterism with the meridian as seen from the latitude of Nabta Playa in epoch 4800 BCE, and we quickly realized that we had hit the bulls-eye with our hypothesis.

The natural place to stand when using the Calendar Circle as an observatory or observing diagram is at the north gate looking south—that is, toward the south meridian of the sky. By mentally registering the image of the nearest set of three upright stones inside the Calendar Circle and then looking up at the sky, the observer in circa 4800 BCE would have seen the three stars of Orion's belt in almost exactly the same configuration. In other words, the three upright stones on the ground are a representation of the three stars of Orion's belt in the sky.

According to our calculations, the perfect match occurs in 4940 BCE, which is well within the margin of error obtained by the CPE's radiocarbon dating. This sky-ground correlation is unlikely to be a coincidence. What additionally supports this conclusion is the fact that the distance—that is, altitude—of the stars measured from the horizon matches the distance of the stones measured from the north rim of the Calendar Circle.

But there was more: Using our computer program and calculations, we established that in 4940 BCE, Orion's belt could be seen at meridian for approximately six months each year, from summer solstice sunrise to winter solstice sunset. These two extreme points in the sun's annual cycle were in fact marked by the Calendar Circle with the line passing through the northeast gate and southwest gate, with one direction pointing northeastward toward the summer solstice sunrise and the opposite direction pointing southwestward toward the winter solstice sunset. To put it more simply, the set of gates of the Calendar Circle, as well as the set of upright stones inside it, worked together to delineate the annual cycle of Orion's belt around 4940 BCE. The ancient astronomer-priests had designed an extremely clever and very simple device to track the cycle of this important stellar asterism throughout the year. We also noted that although 4940 BCE was the best sky-ground fit between the stones and the stars, a similar fit was visible from about 6400 BCE to

4800 BCE.[*11] In practice, then, the Calendar Circle could have been operational for this span of time.

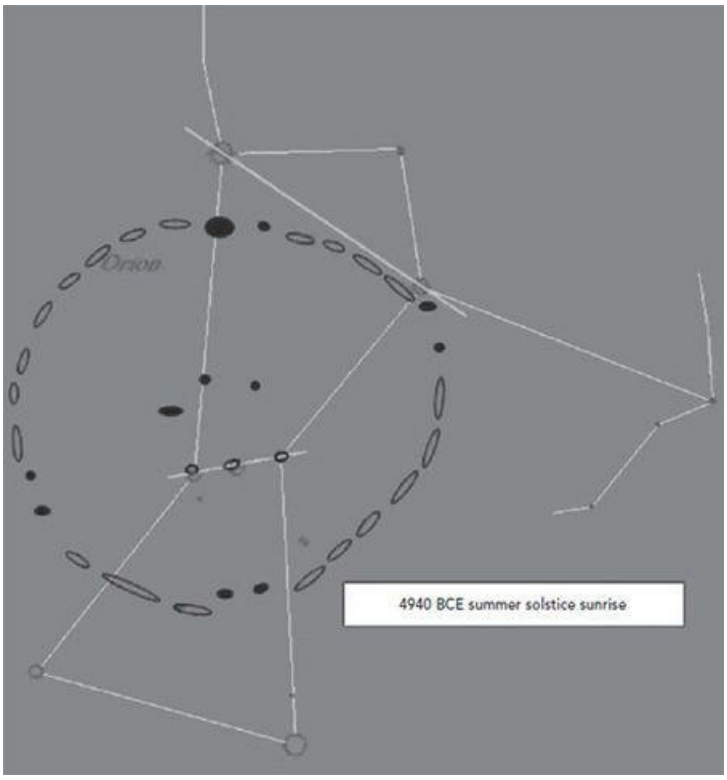


Figure 4.2. Orion's belt matching a diagram of the central stones of the Calendar Circle in 4940 BCE.

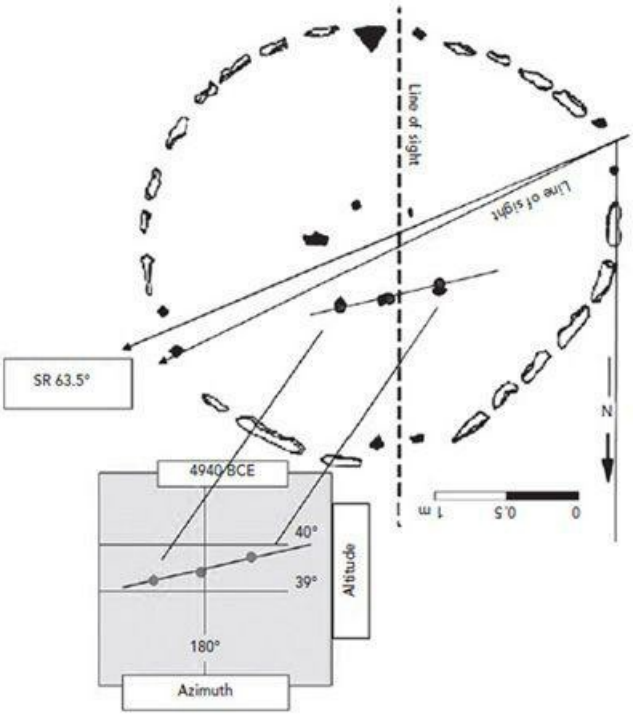


Figure 4.3. Diagram of Orion's belt matching Calender Circle stones at altitude, azimuth, and date.

We can note that we have now completed only half of our solution to the Calendar Circle puzzle: we have identified the function of one of the sets of three upright stones. Next, we turned our attention to the other set, which was placed closer to the southern rim of the Calendar Circle. Now that it was made clear to us that Orion's belt was the key to this prehistoric machine, we could not help noticing that the stars that make up the head and shoulders of the human figure of Orion can also be correlated to these three stones, but at another, more ancient time than 4940 BCE. We calculated that the best fit for the stars of Orion's head and shoulders was in 16,500 BCE (see p. 106). What made this fit an unlikely coincidence was also the fact the angle of the shoulder stars reached their maximum point during the autumnal equinox in the same epoch, and furthermore, in this interpretation, the brightest star in Orion, Betelgeuse, matched the position of

the largest stone. Again, the distance (altitude) of these stars as measured from the horizon matched the distance of the corresponding stones measured from the rim of the Calendar Circle.

If our conclusions are correct, then the Calendar Circle becomes far more than a snapshot of a single observation of Orion in the night sky. Instead, it is an elegant and profound device to show the change caused by precession on the stars of Orion over vast periods of time. In other words, the Calendar Circle becomes a teaching instrument that demonstrates the precession of the stars. We are not proposing that the Calendar Circle was constructed eighteen thousand years ago[*12] but rather that it commemorates two important dates in the precession cycle of Orion—4900 BCE and 16,500 BCE—with the former date being the actual date of its construction and use as indicated by the radiocarbon dating and the latter date being some sort of memorial of an important event, perhaps a beginning in the history of those sub-Saharan herders who came to Nabta Playa in prehistoric times. In additon, the two dates bracket symbolically the two sides of the whole twenty-six-thousand-year precession cycle.

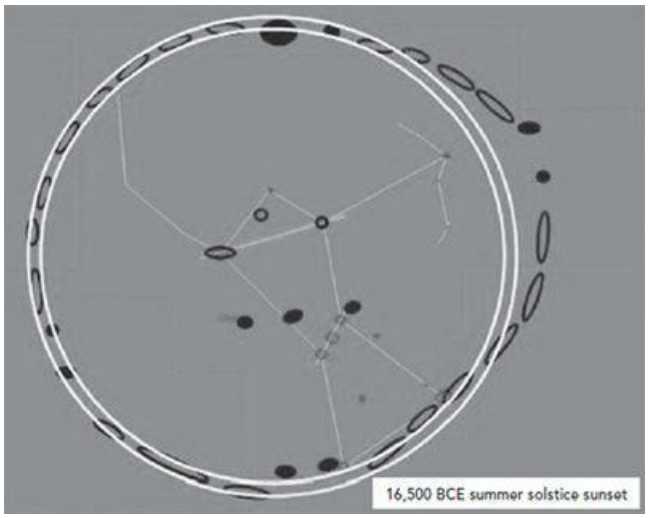


Figure 4.4. Orion's head and shoulders matching the Calender Circle stones at altitude, azimuth, and date

This, of course, presupposes an ability to predict the effect of precession on the stars, namely the cyclical changes in angular tilt and altitude of the constellations over the centuries and millennia. The usual opposition to this is the modern belief that ancient cultures were too primitive and did not have the knowledge or ability to accomplish these predictions. In fact, however, predicting the effects of precession—even without telescopes and sophisticated mathematical knowledge—is not as difficult as it seems to be. This is because the apparent motion of precession is essentially the same as the yearly apparent motion of the sun across the sky—except not in one year but over twenty-six thousand years. An intelligent mind of either today or thousands of years ago that was attuned to careful observation of the changes in the sky and privy to records kept over many generations need only have made a conceptual link in order to create such a device as the Calendar Circle at Nabta Playa and enable it to work with the yearly cycle as well as the precession cycle.

In other words, there are essentially two ways to grasp the effects of precession on constellations: (1) adding together incremental measures over many years and building up a mathematical model for how the sky moves gradually (as it is generally believed the ancient Greeks did), or (2) making a sort of vision-logic mental leap that suddenly grasps the geometric shifting of the whole cycle. Of course, such a conceptual mental leap required a particularly subtle and astute mind, but the Neolithic human's brain was perfectly able to perform such an intellectual task. Albeit, the design of the Calendar Circle involved a stroke of genius—indeed, probably many such strokes over many generations—but once constructed, the Calendar Circle was so user-friendly that all those who chanced upon it could easily have realized its meaning, especially those who had been avidly observing and studying the night sky, as did the ancient dwellers of the Sahara. In addition, it is likely that as part of the whole ceremonial complex at Nabta Playa, the Calendar Circle was understood and used by generations of astronomer-priests not merely in isolation, but as part of a broader context of the other structures in the area. We can see that some of the stones, especially those from the north gate, are composed of finely worked and shaped hard stone, which further indicates a refined sense of design and significant effort on the part of the Calendar Circle builders. We can discern in the Calendar Circle the product of minds that were keenly attuned to the subtleties of annual cycles and the long-term cycles of the heavens, and to the ability to represent such awareness elegantly in a stone diagram. Indeed, after people today see animated graphics of how the Calendar Circle works, they immediately understand and appreciate the plausibility of these conclusions. We have presented similar graphic

animation[7] at meetings of professional scholars in Atlanta, Georgia,[8] and Rhodes, Greece,[9] in 2004, as well as at meetings and public conferences in San Diego, California, in 2007; in Dubai, UAE, in 2008; and in Rome, Italy, in 2009—and the audiences immediately grasped how and why the Calendar Circle was used by the ancients. Regarding the scholars, however, although they easily grasp the idea, their academic conditioning often blocks them from changing their own preconceived beliefs about the Nabta Playa ancient people. Others who are more skeptical suggest that the data of field archaeologists, especially having to do with the astronomy that matches the stones, may have been in error.[*13]

We, however, have double-checked the source of the Calendar Circle data and have ourselves examined the remains of the circle. Further, with regard to the nearby megalithic structures, we also have undertaken measurements and have relied on both the field maps provided by archaeologists as well as very accurate satellite photography of Nabta Playa. What clinches our interpretation and conclusions that the ancient Nabta Playa astronomer-priests paid significant attention to Orion's belt as part of a unified system of tracking the changes in the sky is the fact that similar astronomical activities are also attributed to the other megalithic structures in the ceremonial complex.

SPACE AGE MEETS STONE AGE

In chapter 3 we saw how the ceremonial complex at Nabta Playa consists essentially of two major features: large stones, many of which are shaped and placed on the sediments of the ancient dry lake; and large, sculpted rocks and sculpted lumps of bedrock beneath the sediments. The 1998 *Nature* letter and other early CPE reports on Nabta Playa dealt only with the astronomy of the Calendar Circle; they did not attempt to interpret the astronomy of the megalithic alignments, although they did report some of these megaliths' various orientations. Finally, however, in 2001 the CPE published their report and in it gave their tentative interpretation of the megalithic alignments and the GPS coordinates of each megalith. They determined that the twenty-two megaliths formed six alignments that radiated out from Complex Structure A, and they proposed that these alignments were intended to designate the rising locations of two important stars, Dubhe and Sirius, and also the stellar asterism of Orion's belt. Three alignments (A1, A2, A3) pointing north aligned to Dubhe at three different dates in the fifth millennium BCE; a fourth alignment (C1) pointed, also in the fifth millennium BCE, toward Sirius; and two alignments (B1 and B2) pointed toward Orion's belt at two different dates in the fourth and fifth millennium BCE.

Yet a serious problem with their data invalidated the dates they gave for these alignments. It is an understandable fact that most people do not question or verify the data and conclusions given in a technical or scientific publication by university professors of the caliber of Fred Wendorf, Kim Malville, and Romuald Schild of the CPE. Having already developed our own interpretation for the Calendar Circle before the CPE's 2001 site report was published, we were keenly interested in their alignment data for the megaliths. In order to verify the link among the alignments of the six rows of megaliths and the rising point of stars on the horizon, it was necessary to convert into azimuths the GPS coordinates of the megaliths given in the 2001 report and then to match them to the calculated azimuths of the proposed stars. Yet when we tried to convert these GPS readings into azimuths, we found that they did not match the published azimuths in the 2001 report! This meant that the dates for the stars' rising were also off. Only the azimuth given for Orion's belt was more or less the same as ours—but those given for Sirius and Dubhe differed radically from our calculations, which were in fact based on the GPS readings published in the 2001 report. Something clearly was not right. To make matters worse, the azimuths for the six megalithic alignments in the 2001 report were significantly different from those previously given in the 1998 *Nature* letter. Further, some of the CPE's calculations of ancient star locations differed from our calculations, even before they were matched to rising azimuths.

All this was very confusing, for it was impossible to tell from these reports whether the raw GPS readings taken on location were in error or that the CPE calculations to convert these into azimuths was in error. We determined that it was best to ask the CPE about this. The lead author replied that we should contact another author who was responsible for the data in the relevant 2001 report. While we waited for the response, as luck would have it, the Space Age provided us with another and better way to clear up this confusion: DigitalGlobe, a high-tech corporation, was in the process of developing the first high-resolution satellite-imaging system for commercial use. In November 2000 they twice attempted to launch their Quickbird 1 satellites from Plesetsk Cosmodrome in Russia, but both rockets failed and the satellites were destroyed. On October 18, 2001, however, the Quickbird 2 satellite was successfully launched from Vandenberg Air Force Base in California, and after testing and calibration, DigitalGlobe began making commercially available 60-centimeter, high-resolution imagery from space. With this kind of resolution, we estimated that we could probably identify the Nabta Playa megaliths from space and obtain for ourselves the coordinates for our calculations. We

thus sent in an order to Quickbird to task the satellite for us and obtain an image of Nabta Playa with their high-resolution data. As it turned out, we were likely the first to use Quickbird for archaeoastronomy. On December 31, 2002, Quickbird flew directly over Nabta Playa on a cloudless day and snapped the image with the coordinates we had supplied. After receiving and preparing the Quickbird data for analysis, we were thrilled to find that the Nabta Playa megaliths could be seen in the satellite image. Using the descriptions of individual megaliths given in the 2001 CPE report alongside some ground-based photographs published by Fred Wendorf, we were able to identify in the satellite image all the megaliths as well as Complex Structures A and B (and also other intriguing features, which we will discuss later). After georectifying the image and then correlating it to latitude and longitude, we were able to measure latitude and longitude coordinates for each of the megaliths. These coordinates were similar to those published by Wendorf and Malville in the 2001 report. This suggested, of course, that it was not the GPS readings obtained by them that were incorrect but rather that the CPE had made errors in their calculations. Because there was still a shift in our satellite-determined measurements, in order to be absolutely sure of our results we decided to go to Nabta Playa and take our own GPS measurements. The stakes were too high to rely only on the data we had thus far compiled, and we felt that a journey to Nabta Playa was well worth the cost and effort.

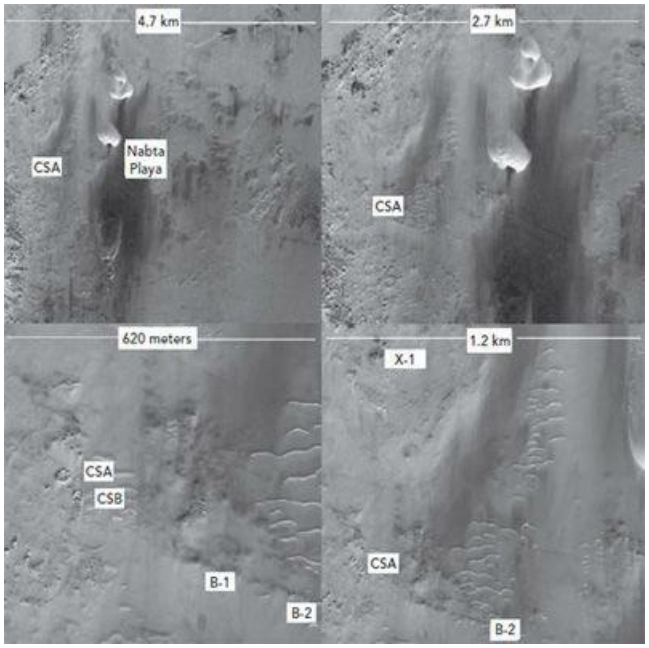


Figure 4.5. Zooming into the Nabta Playa satellite image (Digital Globe, Quickbird). Complex Structure A is labeled CSA. Also labeled are megalith lines B1 and B2, megalith X-1, and Complex Structure B (CSB). Note that that circular rings near CSA and CSB are the detritus left after excavation of these structures, not their original formation. The bright features in the center of the playa (seen in the upper two images) are actively moving sand dunes.

In October 2003 we used the service of a British safari tour company to secure the necessary permits from the Egyptian government to visit Nabta Playa, and we arranged for a very small safari tour to make a deviation from their route and deliver us to the site. Egyptian regulations also required that we be accompanied by an Egyptian military officer as well as an inspector from the Egyptian antiquities department, a Supreme Council of Antiquities (SCA) Egyptologist. After a long trek by jeep from Cairo via the desert oases route, we arrived in the evening near Nabta Playa and set up camp 5 kilometers (about 3 miles) away in order not to cause any environmental disturbance of the important archaeological site. Before leaving from Cairo, we had coded into our handheld GPS receiver the coordinates of the megaliths obtained from the Quickbird satellite data. Now, some two hours before dawn, we were ready to walk from camp to the Nabta Playa ceremonial complex. As we prepared to set out alone, however, the SCA Egyptologist who had come along asked if he could accompany us, perhaps out of curiosity but also to educate himself, because we were amazed to find that he knew nothing about Nabta Playa.

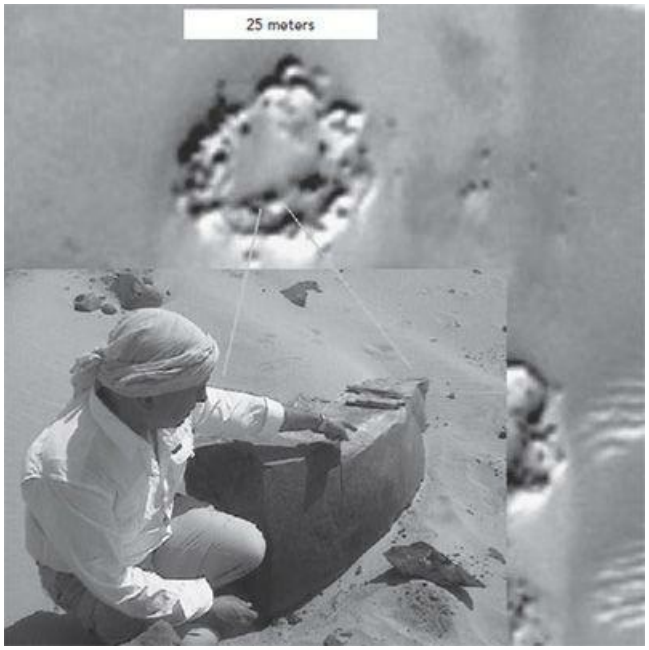


Figure 4.6. The excavation debris from CSA, in satellite image, with one of the megaliths as seen on the ground in April 2008

Wondering what the ancient people who had once lived there would have thought of us, on a chilly dawn carrying a handheld GPS, we set out on foot from our campsite to the world's oldest astronomical site. It seemed to us that the ancients would have been totally at ease moving around in the dark, using the stars for navigation, while we, with all our technological know-how, moved clumsily in the dark, clinging to our GPS tracking device in order not to get lost in this no-man's-land of empty desert. Five kilometers (about 3 miles) can seem a very long way to those trekking on foot and in the dark in one of the most vast and hostile environments on Earth. After a while, when we lost complete sight of our camp, and as we surveyed the horizon as a backup to our GPS navigation, the Egyptian inspector began to get somewhat nervous. He wrongly interpreted that we were totally lost, but we quickly reassured him that, with our GPS navigation, we knew exactly where we were. As we continued to trek in the dark, however, our reassurances failed to calm the inspector, and he began insisting that we should walk in a different direction. A serious dispute ensued. We stopped listening to the inspector's lament and decided to focus on our GPS indicator. We told him that he could go in a different direction if he wanted to or follow us with our GPS. After some deliberation, he decided to follow us, but with the caveat that his protest had been duly registered.

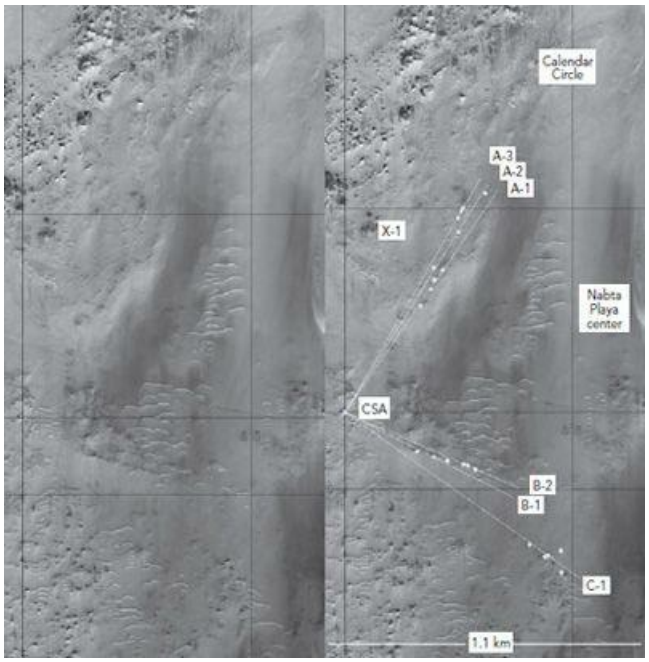


Figure 4.7. Satellite image of the area of Nabta Playa containing the megalith alignments. Left, satellite image with black gridlines for measuring; right, the megalith alignments and the Calendar Circle appear labeled, but the circle stones are too small to be seen in the satellite image.

Finally, to our relief, the light from the growing dawn was strong enough for us to spot in the distance the first megaliths of Complex Structure A. The inspector beamed at us, and with a broad gesture of his hand to express his excitement and approval, he seemed to tell us that all the previous animosity toward us was quickly forgotten. We had at long last arrived at Nabta Playa, but our work was only just beginning. We estimated it would take all morning and several more kilometers of fast walking in this vast complex to get all the GPS readings and photographs needed for our purpose. Slowly and diligently, we recorded the GPS of all the megaliths, and we also had enough time before noon to investigate a mysterious feature beneath the largest megalith at Nabta Playa—labeled X-1—that had shown up on the Quickbird satellite image. The day was now becoming seriously hot, but we pressed on to visit the Calendar Circle and took some photographs for our own use. When we were satisfied that we had all the information and photographs we wanted, we rendezvoused with the jeeps, and after a quick sandwich break and refreshments, we headed south to connect with the new tarmac road that would take us to the city of Aswan on the Nile.

Back home in California, we carefully analyzed our GPS field measurements and compared the results to those obtained from the Quickbird image and found them to be in agreement (although we had to make a small correction for the very slight error in the satellite's pointing vector from space). We now had multiple corroborating coordinate readings for all the megaliths, and, armed with this data, we were able to determine their exact alignments, satisfied that at last we could do this with certainty. We found that the 2001 CPE report included raw GPS coordinates for the megaliths that were fairly accurate, but azimuth calculations derived from them were incorrect. Correcting this error yielded a completely new set of dates for the stellar alignments of the six rows of megaliths. Most significant was the alignment to the rising of Sirius. Malville and Wendorf had proposed that one of the megalith lines, C1, was directed toward the rising of Sirius in about 4820 BCE, but our calculations showed a much earlier date of around 6090 BCE. At this point we sought the support from a close colleague, Paul Rosen, from our previous interplanetary robotic space mission work, who was now a leader in spacecraft radar remote sensing technology. Together in June 2005 we published the new results for the Nabta Playa megalith alignments in a peer-reviewed academic journal.[10] Because our results showed that the megalith alignments given by Malville and Wendorf were substantially in error, we proposed a new set of dates for around 6200 BCE for the stellar targets that fit the corrected data.[*14]

Although we were pleased to see that in 2007 Wendorf and Malville (with Schild and Brenmer of the CPE) formally acknowledged their errors and accepted our corrected calculations for the azimuths of the six lines of megaliths, they nonetheless rejected our earlier date of circa 6200 BCE, because, they point out, some of the megaliths in the alignments were on top of playa sediment that was dated to approximately 5100 BCE, and also 6200 BCE is "about 1500 years earlier than our best estimates for the Terminal Neolithic."[*15]

Even though we do accept that some of the megaliths were placed after the sedimentation of the playa's basin, we also note that in their 2007 article Wendorf, Malville, and their coauthors suggested (as we also did earlier) that the original part of Complex Structure A, which is the center of all the megalith alignments and is part of the bedrock beneath the playa sediments, was "part of the symbolic landscape of the Middle Neolithic and became significant before the establishment of the complex ceremonial centre. Perhaps their locations had been marked by rock cairns before gradual burial by playa sediments."[11] This indicates that there was much activity at Nabta Playa during earlier epochs, which is in any case confirmed by many radiocarbon dates, with most clustered around 6000 BCE.[12] On this basis, and also on the dating of circa 6200 BCE obtained from the corrected calculations, we reject the notion that none of the megaliths at Nabta Playa could have predated terminal Neolithic time, because most of the field evidence shows that parts of the ceremonial complex were indeed created before the terminal Neolithic.

SIRIUS, THE CIRCUMPOLAR STARS, AND ORION

We now felt that we were in a good position to integrate our and the CPE's field findings and derive from them the most robust interpretation that fits the context of Nabta Playa. The findings that emerge from this integrated analysis are:

1. There are at least nine megaliths that form the three lines—A1, A2, and A3—that point north. These track the star Dubhe in the Big Dipper over a considerable period of time.
2. There are at least six megaliths that form lines B1 and B2 pointing southeast. These track the bright star Sirius at two epochs.

3. Sirius also coordinated simultaneously with the star Dubhe in the Big Dipper so that their alignments formed an approximate 90-degree angle. (This curious connection also had been noted by Wendorf and Malville; they commented that the megalith builders of Nabta Playa had "a fascination with right angles.")[13]

This possible simultaneous observation of Sirius in the east and the star Dubhe in the north was of particular interest, because we know from our studies of ancient Egypt that the very same simultaneous observation of Sirius and Dubhe was performed in the alignment rituals of pyramids and temples since the beginning of the pharaonic civilization. This encouraged us to test for the simultaneous observation of Sirius and Dubhe at Nabta Playa, where we found a remarkably accurate and consistent repetition of this pattern of observation. Indeed, an observer at Nabta Playa in about 4500 BCE would have noted immediately that the stars Dubhe and Sirius could be aligned simultaneously with megalith lines A1 and B1, for precisely when Sirius appeared to rise on the eastern horizon and was thus aligned with megalith line B1, the star Dubhe could be seen in the northern sky, directly above megalith line A1 (at an altitude of 33 degrees).

Yet could this be a coincidence? We needed to find further evidence that this was the deliberate intention of the ancient astronomer-priests in order to eliminate the possibility that simple haphazard was at play in the observations. We found that the same simultaneous observation of Sirius and Dubhe with the same right-angle separation took place with two other megalith lines—A3 and B2. This not only confirmed the deliberate intent of the ancient astronomer-priests to delineate this particular simultaneous observation but also proved that they tracked the stars across several generations, from at least 4500 BCE to 3500 BCE. Further, it meant that they were aware of precession and even tracked its effect more than three millennia before the Greeks were supposed to have discovered it. Clearly, the people of Nabta Playa were anything but primitive.

The simultaneous alignments of Sirius and Dubhe at Nabta Playa were amazingly precise for the context and conditions of that distant epoch.[*16] Using our measures of the average azimuths of the megaliths lines, we found that today the angle made between lines B1 and A1 is 91.11 degrees, and the angle between lines B2 and A3 is 91.65 degrees. Precessing the sky back to 4500 BCE, we calculated that the azimuth difference between Sirius and Dubhe when the former was on the horizon was 91.2 degrees. Moving forward in time to about 3500 BCE, the azimuth difference became 91.5 degrees; so the stars matched the stones uncannily well at both dates, which were a thousand years apart. In addition, Dubhe, with a declination of 66.9 degrees in approximately 3500 BCE, had just become an eternal circumpolar star as viewed from Nabta Playa—which means that on its daily journey around the celestial pole, at its lowest point in the sky, Dubhe due north was just skimming the horizon before rising back into the sky to travel around the celestial pole again. This may be significant with regard to why the Neolithic builders monumentalized specifically this date in the alignment.

So far we have explained four alignments of the six megalith lines—A1, A3, B1, and B2—and have found that they work in pairs so that A1 and B1 and A3 and B2 define simultaneous right-angle observations of Sirius and Dubhe in 4500 BCE and 3500 BCE, respectively. Still left to review, however, are lines C1 and A2. In their original reports Malville and Wendorf claimed that line C1 had targeted Sirius in 4820 BCE and that line A2 had targeted Dubhe in 4423 BCE. Yet according to our corrected azimuths for these lines, we determined the date for Sirius to be 6100 BCE, which matched, at a simultaneous right angle at that date, not Dubhe but another bright star in the Big Dipper called Alkaid, located directly over line A2 at an altitude of 22 degrees, when Sirius would have appeared precisely on the horizon and in alignment to line C1. In other words the megalith lines C1 and A2 worked in exactly the same way as the pairs B1 and A1 and B2 and A3 but at the much earlier date of 6100 BCE. We nonetheless asked ourselves why Sirius was observed simultaneously with Alkaid in 6100 BCE, but much later, in 4500 BCE and 3500 BCE, Alkaid was replaced with Dubhe. We will see in chapter 6 that part of the answer, as amazing as it might seem, can be found at the step pyramid complex of Djoser at Saqqara, near modern Cairo and some 1,000 kilometers (about 621 miles) away from Nabta Playa.

King djoser and Alkaid

At the step pyramid complex is the so-called serdab monument in which is found a statue of King Djoser gazing through peepholes toward the star Alkaid in the north at the precise moment when the star Sirius rose in the east. Perhaps the correspondence at Nabta Playa may explain why King Djoser chose to monumentalize himself peering at Alkaid (with Sirius rising) rather than peering at Dubhe. At Djoser's complex in Saqqara (ca. 2650 BCE), Dubhe was at altitude 32.5

degrees and azimuth 22.5 degrees and at near a right angle from the rising Sirius, whereas Alkaid was 112 degrees from Sirius, too far off to be considered a representation of a right angle. Both Alkaid and Dubhe are of the Bull's Thigh constellation; Alkaid is at the hoof end and Dubhe is at the top of the thigh. One possible factor for why King Djoser chose Alkaid instead of Dubhe is that it was closer to the meridian, the most natural place in the sky to view and measure star transits. Now we know another reason. Perhaps King Djoser was monumentalizing the time when his distant ancestors at Nabta Playa around 6100 BCE initiated the ritual of using the Bull's Thigh constellation to track the rising of Sirius with Alkaid. Indeed, the step pyramid complex at Saqqara, built by Egyptian third-dynasty King Djoser and designed by the genius astronomer-priest Imhotep, is the first major gigantic monumental architecture project of the Old Kingdom and a natural place to expect to find that these Egyptians would have monumentalized the origin of the astro rituals that they had inherited from their distant ancestors.

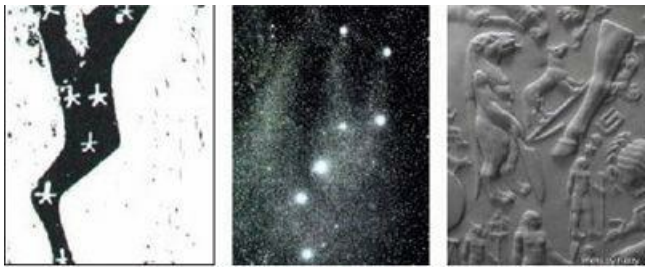


Figure 4.8. Left, ancient Egyptian depiction of the Big Dipper as the Bull's Thigh; middle, photo of constellation; right, constellation as sculpted on the Denderah zodiac ceiling

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For now we could see that part of the answer for the 6100 BCE choice of the star Alkaid to mark the rising of Sirius can be found by considering the long-term astronomical changes in the sky. The precession cycle causes the equinox points (March 21 and September 22) to move along the zodiac at the rate of about 1 degree every seventy-two years and to occupy each zodiacal house or sign for about 2,166 years.[*17]

This cycle also causes the north celestial pole to perform a large circle through a group of constellations in the northern sky. Today the star Polaris in the constellation of Ursa Minor is our Pole Star around which the starry sky rotates every twenty-four hours. In 2500 BCE the Pole Star was Thuban in the constellation Draco. Going back further in time, around 12,000 BCE the Pole Star was the brilliant Vega in the constellation Lyra. As the millennia passed, the celestial pole migrated away from Vega in a circle centered on the neck of Draco, through the shoulders of the constellation Hercules about 9000 BCE. By 6100 BCE there was no Pole Star, but the star Alkaid was some 17 degrees from the celestial pole and was thus a circumpolar star.[†18]

Dubhe, on the other hand, which was 38 degrees from the celestial pole in 6100 BCE, was not circumpolar, because every day it traveled far beneath the horizon, into the underworld. It seems logical to conclude that for this very reason the astronomer-priests at Nabta Playa in 6100 BCE used Alkaid to mark the rising of Sirius but later, around 4500 BCE, switched to the star Dubhe when it grew nearer the celestial pole.[‡19]

The C1 megalith line consists of at least six megaliths in a set that is plus-or-minus 1 degree around azimuth 130 degrees. Given that the Nabta Playa ceremonial complex was used and developed over many centuries, perhaps even thousands of years, it is possible that the megaliths may have incorporated more than one meaning by being directed not only to Sirius but also to other stars such as those of Orion's belt. This possibility was in fact suggested by Malville, Wendorf, and their coauthors in their 2001 report and was discussed in our previous publication[14] in which we showed that the C1 line may have targeted Orion's belt near the epoch of 6100 BCE. Interestingly, at that same date the C1 line also marked a very special and unique occurrence for Orion's belt in the precession cycle: its heliacal rising at the spring equinox. This meant that Orion's belt rose together with the sun on the first day of spring (March 21). This is extremely significant, because it is perfectly consistent with the hypothesis that the Calendar Circle used Orion's belt as a sort of teaching device for the short- and long-term cycles of this special group of stars.

A Star's Vernal Equinox Heliacal rising

The vernal equinox heliacal rising of a star is also essentially the halfway mark between the star's northern culmination when it is seen farthest north on Earth and the star's southern culmination about thirteen thousand years later, when it is seen farthest south on Earth. As the people of Nabta Playa used and constructed the playa basin to teach about, study, and employ in ritual ceremony the starry sky and heavens, there were certainly smaller, temporary stone constructions there all the time. When the primary asterism they used to conceptualize how the sky moves, Orion's belt, passed that special time in its cycle—vernal equinox heliacal rising—the time was best to create monumental megalithic alignments that would last through the ages. At the time of the height of the Calendar Circle at Nabta Playa, Orion's belt and Sirius were separated in declination, and so rising azimuth, by an angle of less than 2 degrees. Consequently, they passed horizon alignments separated by only a couple of hundred years.

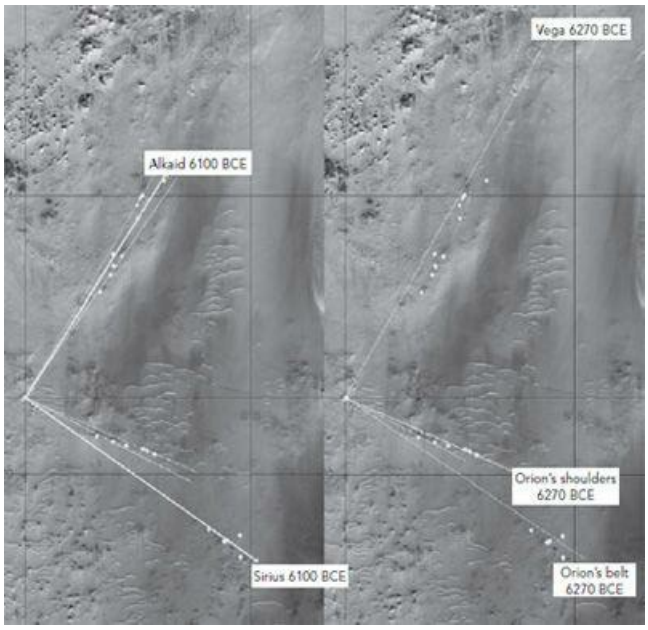

Figure 4.9. Left, the Sirius plus Alkaid alignment ca. 6100 BCE; right, the Orion stars and Vega depicted at one date ca. 6270 BCE. From that epoch, the Orion stars all move through vernal equinox heliacal risings, as the Vega rising line moves southeast over the megalith alignments.

Another association with the date of 6100 BCE is that the rising of the bright circumpolar star Vega was in line with the A2 megaliths as Orion's belt began rising over the C1 line.[*20]

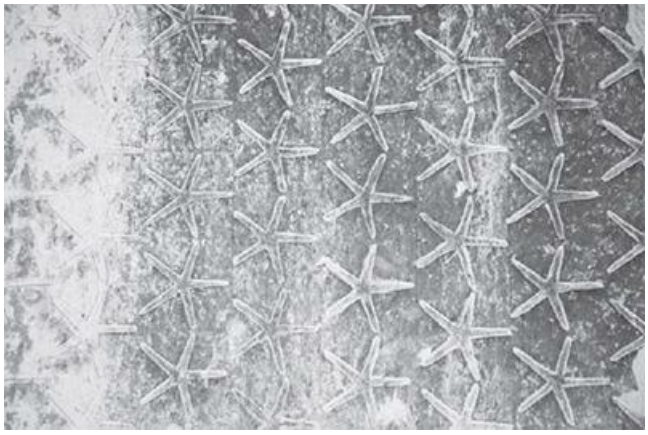

Figure 4.10. The star-studded ceiling in Tepi I pyramid at Saqqara (Sixth Dynasty)

In summary, at Nabta Playa in 4500 BCE and 3500 BCE there were megalith alignments (B1 and B2) oriented to the rising of Sirius that ran eastward (as suggested by Malville and his coauthors in 2007), and we have shown that these alignments were used simultaneously with—and formed right angles with—megalith alignments (A1 and A3) to the star Dubhe, which ran northward. It also seems that in 6100 BCE megalith alignment C1 was directed to the rising of Sirius, which was used simultaneously with the star Alkaid in the north. In addition, in 6200 BCE line C1 may also have been

associated with the heleical rising of Orion's belt at the spring (vernal) equinox. We have seen that these Orion's-belt alignments for C1 were consistent with the use of this stellar asterism in the Calendar Circle at that same epoch. It seems, then, that the C1 megaliths were either off the playa and thus not affected by the heavy playa sedimentation period or were remnants of much earlier ceremonial structures (as was Complex Structure A).[*21]

These findings and conclusions are perhaps better visualized in the table format below.

MEGALITH ALIGNMENTS AT NABTA PLAYA

MEGALITH LINE	MALVILLE AND WENDORF ET AL (2007)	OUR MEASUREMENTS (2005)	ASSOCIATION
A1	30.6 degrees	30.00 degrees	Dubhe simultaneous to Sirius rising ca. 4500 BCE
A2	28.1 degrees	27.68 degrees	Alkaid simultaneous to Sirius rising ca. 6100 BCE; also, Vega ca. 5840 BCE autumnal equinox heliacal rising; also, Dubhe simultaneous with Sirius rising ca. 4000 BCE
A3	26.3 degrees	25.86 degrees	Dubhe simultaneous to Sirius rising ca. 3500 BCE
B1	120.1 degrees	121.11 degrees	Sirius rising ca. 4500 BCE, with Dubhe at line A1
B2	116.6 degrees	117.49 degrees	Sirius rising circa 3500 BCE, with Dubhe at line A3
C1	125.4 degrees (2001)	130.1 degrees	Sirius rising ca. 6100 BCE, with Alkaid at line A2; also, Orion's belt at vernal equinox heliacal rising ca. same epoch

We can see from this table that the megalithic alignments at Nabta Playa represent a coherent and consistent ensemble that has meaning when it is deciphered with astronomy. Clearly the alignments, instead of being random, are carefully made to target the rising of stars that were important ritualistically and also practically to the ancient people of Nabta Playa. The anthropologists of the CPE as well as other archaeoastronomers who have carefully studied this site are all in agreement: Nabta Playa was an important ceremonial center that required considerable complex social organization, physical effort, and resources to construct and maintain over a long period of time. It thus is sensible to conclude that embodied in the design of the ceremonial complex is some very high meaning that can be read with astronomy. As we will see later this system of knowledge—we can perhaps call it star knowledge—at Nabta Playa was carried forward in time and space to the pharaonic civilization of the Nile Valley. Meanwhile we'll take an initial look at a well-known star ritual from ancient Egypt that shows how and why Sirius and a star in the Big Dipper, Dubhe, were used simultaneously to align sacred megalithic monuments from earliest times harking back to 3200 BCE and perhaps even earlier . . . just as they were used at Nabta Playa.

A RIGHT ANGLE AND TWO STARS

The simultaneous observation of Sirius rising in the east and a star of the Big Dipper in the northern sky is a strong, nontangible piece of evidence that shows a direct link between the prehistory of the Sahara and the archaic period of ancient Egypt and the great civilization that ensued from it. At one end of this link is the ceremonial complex of Nabta Playa and at the other end is the earliest ceremonial complex in the Nile Valley on the Island of Elephantine near Aswan. In chapter 6 we will look directly at this link, but for now we will look at an important early Egyptian ritual known as *stretching the cord,* because it is likely that in this lies the very source of why and how the simultaneous observation of two stars was used by the Egyptians and, earlier, by the people of Nabta Playa in association with the astronomical alignment of megalithic structures.

The ancient Egyptian texts and temple reliefs explain that stretching the cord was carried out by a priestess, who represented a deity associated with the stars, and the pharaoh. Both the priestess and pharaoh held a rod and a mallet, and a rope or cord was looped between the rods. The priestess stood with her back to the northern sky and faced the pharaoh. This scene is depicted on many temples, and the texts alongside it tell us that the pharaoh observed the trajectory of the stars with his eye in order to establish the temple in the manner of ancient times. In the texts we are unequivocally told that the king looked at a star in the Big Dipper (called Mesekhtiu, the Bull's Thigh). Some of the texts, however, mention the star Sirius and imply that it also was somehow involved in the ritual.

Exactly how was this stellar alignment ritual performed? Was the king aiming his gaze at a star in the Big Dipper

while, simultaneously, the priestess announced the moment of the rising of Sirius, after which the cord between them was stretched and the rods were hammered into the soil, thus fixing the axis of the future temple? A further clue to the ritual is that the pharaoh observed carefully the motion of a star in real time. Inscriptions on the Temple of Horus at Edfu, accompanying portrayals of the ritual, quote the pharaoh: "I take the measuring cord in the company of Seshat. I consider the progressive movement of the stars. My eye is fixed on the Bull's Thigh constellation. I count off time, scrutinizing the clock . . ." [15] This is also what might have happened at the ceremonial center of Nabta Playa thousands of years earlier. An observer who was standing at Complex Structure A held a rod with a rope attached to it. Another observer, also holding a rod, stood some twenty paces north of the first observer with his or her back to the Big Dipper. This second observer then waited for Sirius to rise, and, at that precise moment, he or she gave the signal to the first observer to stretch the cord and aim it toward a star in the Big Dipper. Then, when the alignment was achieved, the first observer was to fix the rod in the soil. Later, a row of megaliths would be set along this alignment. On another day, this ritual was repeated to set an alignment toward the rising spot of Sirius on the horizon as seen from CSA. Thus the two lines of stone work together, one going north (line A) and the other southeast (line B). This interpretation is consistent with the ancient texts that describe that the Dubhe alignment required real-time observing of the star in the sky, whereas Sirius rising on the horizon is more easily set. These two lines also form a rough right angle, a feature that surely would have been noticed and intriguing.

The relation of Dubhe and Sirius

We can go back in time to approximately 9000 BCE , when the north celestial pole is near the shoulders of the constellation Hercules. Dubhe rises many hours before Sirius and is very high in the sky when Sirius rises, and Dubhe's declination is so far from north that Dubhe and the whole Bull's Thigh constellation are far from being circumpolar stars. If we turn the clock forward to around 4500 BCE , the celestial pole has moved so that it is close to the Bull's Thigh constellation, Dubhe has moved north in declination to become a circumpolar star, and Dubhe is decreasing in altitude so that it is at only 33 degrees altitude when Sirius rises, as seen at Nabta. The low altitude of Dubhe when Sirius is on the horizon means that the angular separation of the two stars in the sky is essentially preserved in the angle of their alignments on the ground.

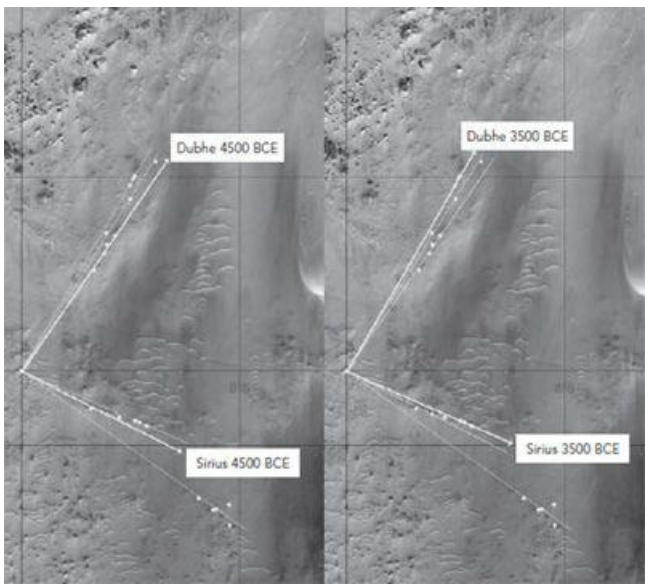

Figure 4.11. The right-angled megalith alignments of Sirius and Dubhe at 4500 BCE and at 3500 BCE as the stars moved through precession

Indeed, any architect or designer will readily agree that right angles are universally recognized by humans not least because they define, among many other things, the four cardinal directions of Earth. Sirius rising may have been marked by the star Alkaid in the Big Dipper from the seventh millennium BCE to about 4800 BCE, but after that date and until 3500 BCE the star Dubhe in the Big Dipper replaced Alkaid, and it was noticed that Dubhe and Sirius always formed a

right angle. After that date, Nabta Playa and the ceremonial complex were abandoned.[*22]

ONE YEAR OF ASTRONOMY AT NABTA PLAYA

Now suppose you are viewing the various astronomical events during one year at Nabta Playa—say, 4500 BCE. You begin your observing year on the afternoon of the winter solstice. You intend to use the Calendar Circle that night, and so you observe that the winter solstice sun sets into the solstice gates of the circle and the sky begins to darken. You move to the north end of the circle to use the meridian gates as your sky-viewing guide, and over the next forty-five minutes the sky becomes dark enough that the stars seem to pop out around you. Then, fifty-five minutes after sunset, directly on the meridian, you see the belt of Orion shining into the deepening dark, oriented very much like the three southerly stones inside the circle. Trailing Orion is the brilliant Sirius, which crosses the meridian an hour and forty minutes later. Two hours after that the very bright star Canopus crosses the meridian, skimming low above the horizon. Perhaps, if you've learned your sky lessons, you know that when you travel north, Canopus drops even lower to the horizon. The starry show continues for eight more hours; then the sky begins to brighten, and the sun rises to make its low winter arc across the sky.

One month later the nightly show is similar, except that the sun sets a bit north of the solstice gates of the circle, and when the sky darkens, you see that Orion has already passed the meridian and Sirius is already there. Two more months pass, and the sun rises due east and sets due west. It is the spring equinox, and now when the sky darkens after sunset, Orion's belt is gone—already set below the horizon—but Sirius is still visible low to the southwest for about forty-five minutes before it too sets. About ten days later Sirius also disappears.[*23] Another twenty-eight days later, just before dawn, Orion's belt reappears in the southeast.[†24]After another twenty-nine days, Sirius also reappears in the southeast, when you can glimpse it momentarily before dawn.[*25] At Nabta Playa you have moved south of the Calendar Circle to view this heliacal rising of Sirius from Complex Structure A, the central megalithic construction that your society built to view stars rising over lines of megaliths. There, just before dawn, you see Sirius rise above a distant line of megaliths to the southeast, and when you look to the northeast you see hovering there, above another line of megaliths, Dubhe of the Bull's Thigh constellation.

Of course, these alignments are just as you have expected, because this is in fact a year of heavy construction, when you are completing the building of those two lines of megaliths. It is now just four weeks before summer solstice, and in seven more days, it will be exactly three weeks before summer solstice, the time when, at noon, the sun passes directly overhead and the standing stones cast no shadow, which occurs only twice per year.

Now the annual rains have come, and if they are plentiful, the playa basin fills with shallow water. The Calendar Circle is located on a low mound just off the edge of the playa, so you can continue your star viewing from there even while the playa is full of water. On the night before summer solstice you watch Orion's belt rising about an hour after midnight, followed, as always, by Sirius an hour and forty-five minutes later. Orion's belt moves toward the meridian and fades out of view about an hour before it reaches it, as the sky brightens and the sun rises in the solstice gates of the Calendar Circle. Three weeks after summer solstice the noon sun again passes directly overhead and the standing stones cast no shadow, and the nightly show repeats. This time you can see Orion's belt just approaching the meridian as the sky brightens with the sunrise. The sun now rises a bit south of the solstice gate, as the sunrise location moves toward winter, and the whole annual show will repeat.

Figure 4.12. Photograph of Orion being followed by Sirius beneath the Milky Way

MORE MYSTERIES AT NABTA PLAYA

When some important and new discovery such as Nabta Playa might put into serious question the established views about the origins of civilization, there is a tendency to wait until a suitable theory can be developed before releasing any data about the discovery. The problem with this is that sometimes the data that fits an established theory is regarded as more valuable than mysterious new data that contradicts it.[*26]

Others, like us, take an opposing view. We see the mysterious, unexplained data as more valuable, because if we try to understand the mystery, we might learn something new. To us that is what scientific research is—or ought to be—all about. In this frame of mind, then, we will look in more detail at some mysterious aspects of Nabta Playa in the hope that such an approach might shed even more light on this mysterious place.

We recall that all the megalithic alignments at Nabta Playa radiate out from a central megalithic structure called Complex Structure A. CSA is composed of megaliths that lay on the surface; a large megalith carved by human hands (the so-called cow stone) buried 3 meters (about 10 feet); and finally, berneath the sculpted cow stone, a lump of bedrock, also partly carved by human hands. The megaliths on the surface are arranged in an oval shape, and some are partially sculpted. Two of these are partially sculpted into a curved geometric form, one into a convex form, and two into a concave form, giving the impression that they might have been chunks of a much larger structure that has now disappeared.[16] The cow stone that was buried beneath was 1.9 by 1.5 by 0.7 meters (6.2 by 4.9 by 2.3 feet) and composed of hard, quartzitic sandstone weighing about 2 tons.[17] Photographs of the cow stone immediately after it was excavated show that one part of the stone is finely shaped and smooth and another portion is either unfinished or was roughly flaked. According to Wendorf and Krolik, it "had a flat, possibly naturally smoothed, almost polished top. One side was convex and pecked smooth. At one end . . . there was a fan-like projection that might represent a head." [18] From photographs and video frames of the cow stone taken after its discovery and from taking measurements of the arching of its extended outer surface, we could see that it may have been shaped like a spherical section. As we have seen, the CPE concluded that this sculpture vaguely resembled a cow.[*27]

As an integral part of an intensely astronomical construction linked to stellar alignments, this cow sculpture may be both bovine and supernal, both cow and star—that is, it may be symbolic astrologically. Because it was placed under CSA sometime around the start of the astrological Age of Taurus (the Bull constellation), usually assumed to be ca. 4500 BCE, then a symbolic connection to mark this age is a viable proposition.[†28]

Of course, it is a widely held notion that the ancient Greeks invented the zodiac signs based on their knowledge of Babylonian-Chaldean star lore from the first millennium BCE. Yet there is significant dissent among historians as to the age of the zodiacal signs, with some proposing that they may be much older than we have generally presumed.[19] We can

also note that several megalithic alignments emanating from CSA mark both the rising of Sirius and the Big Dipper—and the ancient Egyptians often identified the former with a cow and the latter with a bull's thigh. Indeed the possibility of a cultural link between the cow stone at Nabta Playa and the ancient Egyptians was suggested by Wendorf when he proposed that this strange, sculpted megalith "may have been the origin of the ancient Egyptians' fascination with working large stones."[20] Many questions regarding this cow stone remain unanswered. How was the top surface so finely polished? How were the fine, sharp, and precise curvilinear edges made? What tools could have been used by ancient people who lived before the age of metal? Unfortunately these questions may never be answered, for the cow stone was removed from Nabta Playa by the Egyptian antiquities authorities and today lies broken in the backyard storage area of the Nubian Museum in Aswan (see appendix 3). We can also recall that the cow stone itself was placed on top of another sculpture that was cut into the living bedrock of the site. This bedrock sculpture has the shape of a large, smooth disk that is about 3.5 meters (11.5 feet) across, with some of its parts and its edges carved by human hands. According to Wendorf and Krolik,

> The north and west sides had been carefully shaped by removing one or two large sections that left a curved outline, following an arched bedding plane in the bedrock. The large sections removed during the shaping of the tablerock were most probably reused as the two large slabs placed in the center of the surface architecture. The top of the tablerock was flat and smoothed. It is possible this was natural smoothing . . . but this seems unlikely since none of the other table-rocks visible at the sourthern end of the Nabta Basin display similar smoothed surfaces. . . . Regardless of how the top was smoothed, the sides were clearly pecked and had a slightly re-curved outline.[21]

Surrounding this bedrock sculpture is a great mystery that has not been adequately investigated. How and why was it sculpted—and, more intriguingly, when was it fashioned? Wendorf initially proposed that it was created during the Late Neolithic—that is, around 5100 BCE, after the playa sediments were formed.[22] Yet if so, we may wonder how the ancient people of Nabta Playa could have known where this outcrop in the bedrock was located if they could not see it, for it was totally covered by a thick layer of sediment. Wendorf and Krolik had no explanation. According to them, however, the ancient people somehow knew where this outcrop was and thus dug through the sediment to expose it. They then sculpted it, covered it with sediment, placed the cow stone above it, covered the cow stone with more sediment, and finally arranged the megalithic architecture on the surface.

This seems quite implausible, and perhaps there is a simpler explanation: the bedrock sculpture long predates the Late Neolithic given by Wendorf.[23] How old is the bedrock sculpture, who built it, and why was it built? What could have been its true meaning? Clearly it was important enough to be made the centerpiece of the Nabta Playa ceremonial complex when the Late Neolithic people placed the cow stone over it thousands of years later. Unfortunately we could not investigate this matter further, for the sediment has been dumped back into the hole, and, as we have learned, some of the surface megaliths have been removed and taken to the Nubian Museum in Aswan while others have been moved on site, scattered randomly (see appendix 3). Whatever might be the solution to the unsolved mystery that lies behind the multilayered and pangeneration construction of the CSA, it is sure to fit into a very elegant astronomical scheme.[*29]

We must also remember that Complex Structure A, although the largest at Nabta Playa, is but one of thirty complex structures in the southwest part of the site. Only two of these structures, CSA and another, CSB, were fully excavated. The bedrock under CSB was also sculpted, but into a different shape described as an inclined oval disc; there was no embedded sculpture above it. A third complex structure was also partially excavated, and two more complex structures had holes drilled into their sediment, confirming the presence of bedrock outcrops. This led Wendorf and his team to conclude that all the complex structures seen on top of the sediments probably contain a sculpted bedrock outcrop covered by 3 or 4 meters (10 or 13 feet) of sediment.

What could have driven the ancient people of Nabta Playa to sculpt all these outcrops of bedrock? Perhaps more intriguingly, when these outcrops were completely covered by sediment carried and compacted by wind and rainfall thousands of years later, how could they have been rediscovered by the people who built the megalith arrangements on the surface? Or, were they not rediscovered by the Late Neolithic people? Perhaps, instead, they were maintained over thousands of years by an even more ancient culture about which we know almost nothing.

Let us not forget, as well, the most provocative question that surrounds these mysterious complex structures. When the CPE, led by Wendorf, started excavations at Nabta Playa in the 1970s, they very much hoped that the many complex structures and tumuli were tombs that contained human remains of high-ranking individuals or even kings. Instead

excavators found the strangely sculpted outcrops of rock and the skeletons of cows in the tumuli. If we bear in mind that the complex structures and the tumuli are an integral part of a vast ceremonial complex that is intensely astronomical and stellar, we may wonder if the empty tombs and cow-bone burials are part of some mysterious star ritual related to some ancestral cult of rebirth. This provocative thought occurs because, as we will see in chapter 6, the same empty tombs have baffled Egyptologists when the Old Kingdom pyramids were explored and found to contain no human remains. Even more intriguingly, in some of the great pyramids of Giza only the bones of cows were found. Further, like the ceremonial complex of Nabta Playa, these pyramid complexes were intensely stellar in their orientation and symbolism. In chapter 6 we will return to this strange link between the empty tombs of Nabta Playa and those empty pyramids of ancient Egypt. Meanwhile, let us examine another mysterious feature at Nabta Playa: the largest megalith, which Wendorf called Megalith X-1.

Megalith X-1 consisted of a pair of giant stones set on an oval-shaped mound of cretaceous bedrock.[26] The larger of the two stones measured 4 by 3.1 by 0.7 meters (13 by 10 by 2.3 feet) and was estimated to weigh some 20 tons. The oval-shaped mound on which the two stones stood seems to have been shaped by human hands.[27] When we looked at Megalith X-1 on the Quickbird satellite image it was immediately apparent to us that it was in the middle of a large spiral arm feature, which was about 50 meters (164 feet) across.[*30]

Upon examining this area during our 2003 expedition to Nabta Playa, we were able to discern clearly this strange, spiral-shaped mound that we had seen on the satellite image. We also found in its middle the fragmented remains of the two giant stones of Megalith X-1. How were these massive stones moved? Why were they placed in the middle of the spiral mound? Was the mound man-made—and if so, by whom and when? We also considered the current condition of all the megaliths at Nabta Playa. Most of them were either toppled or broken or deliberately cut into parts. How did they get to this pitiful state? Closer examination showed that some of the megaliths had been cleanly cut, as if intentionally—but why? Was it, instead of the work of vandals, due to some ancient ritual or symbolic act, when the function of the megaliths became obsolete?[28]

Many of the remaining mysteries of the site involve understanding the bedrock sculptures, which are more ancient than the playa surface megaliths and are only slightly excavated. How extensive are the bedrock sculptures at Nabta Playa? Could there be a whole precursor ceremonial complex that is yet to be discovered? To begin to address these questions, it may be best to use ground-penetrating imaging methods that can see through the playa sediments to the bedrock beneath. Fortunately, launched are new synthetic aperture radar remote-sensing satellites, and there are better ones in progress. With them we have been able to start searching the subsurface at Nabta, and as a result we have hints of intriguing new results.[29]

Though many mysteries at Nabta Playa still remain, those former mysteries that have come to be understood are more than enough to provide us with a vision of a social and cultural complexity that was not expected for such remotely prehistoric people. The level of skill, insight, and social organization, as well as the sophisticated astronomical observations that are incorporated into their megalithic ceremonial complex, should leave us with little doubt that we have in these mysterious ancient people the true precursors of the Egyptian civilization. We will look at this more closely in chapter 6. Meanwhile, we are now going to take a closer look at other prehistoric sites in the Egyptian Sahara that strongly indicate that such activity was not confined solely to Nabta Playa. Instead, it also seemed to extend hundreds of kilometers into the deep desert toward the north and west.

THE SUN TEMPLE OF DJEDEFRE IN THE SAHARA

In chapter 2 we saw the important discovery of the so-called Djedefre Water Mountain (DWM) by the German desert explorer Carlo Bergmann. We recall that on this mountain (actually a small sandstone mound that is about 30 meters—98 feet—high), which is about 80 kilometers (50 miles) south of Dakhla oasis, were found hieroglyphic inscriptions of the names of the pharaohs Khufu and Djedefre alongside prehistoric petroglyphs that contained the water sign and depictions of fauna that no longer exist in this part of the world. Naturally we might wonder, as Bergmann probably did, whether there could be a connection between the prehistoric site of DWM and that of Nabta Playa. True, nearly 400 kilometers (249 miles) separated the two places, but Bergmann's earlier discovery of the Abu Ballas Trail (see chapter 2) proved that ancient people could travel in such arid and waterless desert for much longer distances by creating watering stations along their route. At any rate, perhaps a connection between the two prehistoric sites could be established by the DWM containing evidence of astronomical knowledge that could be directly related to that incorporated in the

ceremonial complex of Nabta Playa. The only way to resolve this issue was to examine DWM ourselves.

In early April 2008, the desert explorer Mahmoud Marai, a close colleague and friend of Carlo Bergmann, organized an expedition for us to visit the DWM, among other sites in the Egyptian Sahara. We started off-road near Dakhla oasis and headed south, and, after a couple of hours of bumpy riding in Marai's well-equipped Toyota Landcruiser, we reached DWM late in the afternoon. Because it was fast growing dark, we decided to set up camp and wait until dawn to climb the small escarpment that led to the hieroglyphs and petroglyphs on the east side of the mound. We were up before the crack of dawn the next day, and after a swift breakfast of hot tea and biscuits, we made our way 10 meters (about 33 feet) up the man-made escarpment and reached a platform, also man-made, that brought us level with the inscriptions.

The most prominent of the inscriptions is at the center of the east face of the mound. As we saw in chapter 2, it consists of a royal cartouche that bears the name of the pharaoh Djedefre, which is enclosed in a rectangle with two protrusions at the top that Egyptologists have assumed to be a form of the hieroglyph for "mountain" (see plate 2). As we have seen, a similar sign, but with a sun disk between the protrusions, was used to denote "horizon" or, more specifically, the Place of Sunrise. Because DWM faced east—the place of sunrise—it seemed to us more apt to regard this mound not as Water Mountain but rather as a sun temple. There was, however, one snag with this hypothesis: the view toward the eastern horizon was blocked by an elongated hill about 200 meters (about 256 feet) east of DWM.

This elongated hill or mesa is about 70 meters (230 feet) long and 12 meters (39 feet) high and has a flattened top with a very noticeable depression or notch in the middle. As far as we could tell, neither Bergmann nor the German scholars who studied DWM saw this hill as significant, but as we watched the sun rise over it, it became apparent to us that the hill was positioned in such a way that it would act as a sighting device for marking the yearly course of the sun and the two solstices and two equinoxes. We named this mesa Horizon Hill. Using our GPS and electronic compass, we determined that at the equinoxes the sun would rest in the notch in the center of Horizon Hill, creating the hieroglyph

We were at DWM on April 9. We established the location as 25.40 degrees north and that sunrise on that day would be 82.09 degrees on the horizon and 83.35 degrees when breaking at 7:06 a.m. over Horizon Hill (which we estimated to be at 2.75 degrees altitude above the geometric horizon). Figure 4.13 shows the view from DWM with the sun breaking over Horizon Hill. We calculated that at spring equinox (March 21), the sun will be at azimuth 91.2 degrees when it breaks over the notch on Horizon Hill, which matches the actual azimuth of the notch as seen from DWM.

We took GPS measures in front of the central cartouche on the sun temple and also on top of Horizon Hill. On the hill we took measurements on flat areas near the north and south ends of the hilltop and at the notch near the center. The measurements we took gave azimuths of 77.9 degrees, 91.1 degrees, and 106.7 degrees, respectively, as viewed from the central cartouche on the east face of the sun temple. We also measured the flat area of Horizon Hill and determined it to be 8 meters (26 feet) higher in elevation than the central cartouche on the sun temple, and it was positioned some 170 meters (558 feet) east of the sun temple. We thus estimated that the hypothesized solar notch was at altitude 2.7 degrees above the geometric horizon when viewed on Horizon Hill. We calculate that at equinox the sun would indeed be resting in the notch at 2.7 degrees altitude and azimuth 91.2 degrees when appearing over Horizon Hill. At the summer and winter solstices and at the same altitude of 2.7 degrees, the sun would be at azimuths 63.3 degrees and 117.7 degrees, respectively. Because we photographed the notch in situ as we took the GPS point there, our measure of the azimuth of the notch is very precise and accurately coincides with the equinox sun when it breaks over Horizon Hill. Yet we recognize that our azimuth measurements of the solstice sunrises at the north and south edges of Horizon Hill are less precise, because we did not have an independent calibrating marker. On a future visit we hope to refine our measurement of the two edges of Horizon Hill with respect to the solstice paths of the sun.

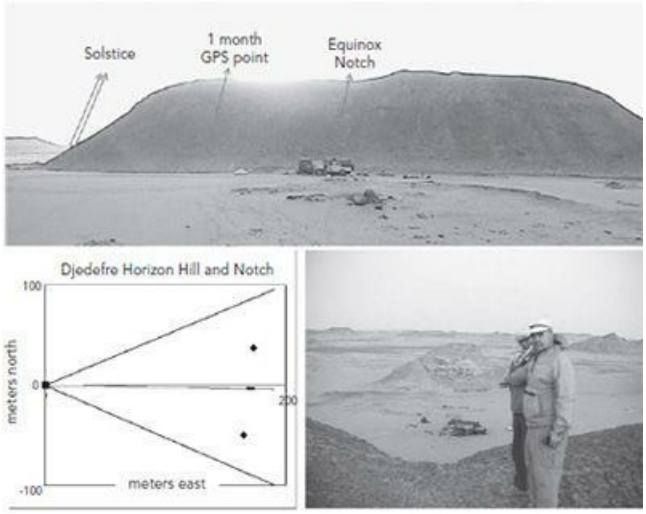

Figure 4.13. Sunrise over Horizon Hill at Djedefre sun temple, April 2008. Top: the rising azimuths at equinox over the notch in the hill and the approximate solstice rising azimuth. Lower right: Brophy and Bauval standing, before sunrise, at Horizon Hill notch and pointing to the east, facing the Djedefre cartouche. Lower left: the three GPS points taken at the top of Horizon Hill—at the notch and two central hilltop locations—the azimuths to sunrise over the notch from the Djedefre cartouche, and the solstice sunrises.

It seems very unlikely that the emissaries of the sun king Djedefre, who had come to this place and probably stayed for extended periods of time, would have failed to note that Horizon Hill functioned as a natural solar calendar. If such a conclusion is correct, however, it would mean that, in all probability, the same was noted by the prehistoric people who had also stayed here. Was there any evidence of this? In light of this probability, we must re-examine some of the inscriptions and engravings on the mound.

Other than the Egyptian hieroglyphs and petroglyphs of fauna and other symbols, there are also arrows carved on the east face of DWM that conspicuously point upward, as if inviting an observer to look at the zenith of the sky. These arrows appear to be prehistoric rather than Old Kingdom Egyptian, because of their style of inscription and because near them are images of animals that could not have been present in Old Kingdom times. Today the site is a little less than 2 degrees north of the Tropic of Cancer, but in ancient times it was a bit closer to the Tropic line, so that each year at summer solstice the sun would pass almost directly overhead at noon—that is, near the zenith. Could it be that ancient Egyptians of the Old Kingdom, during the reigns of Khufu and Djedefre, came here and rediscovered a prehistoric sun temple, which they then transferred to their own solar hieroglyphs? Judging from the evidence, this would seem the most likely scenario.

Within the central engraving, there is a finely rendered glyph found under the two peaks representing the horizon, or the Place of Sunrise. The lower part of that glyph appears like hieroglyphic determinative S12 by Gardiner's system,[*31] which indicates gold/white gold/ silver; the upper part of this glyph is composed only of three flag poles or standards, which we speculate may represent the three stations of the sun on the eastern horizon: the two extreme stations marking the solstices and the midstation marking the equinoxes. When we view the eastern horizon from DWM, these three stations are marked by the extreme ends and midpoint (the notch) of Horizon Hill. And visually this rendering of S12 seems reminiscent also of the cosmogonic solar barge said to carry the sun across the sky, and usually carrying one or more deities, yet here it carries the three stations of the sun—whether the original artists intended this visual metaphor, we don't know. Unfortunately, we could stay at DMW only a few hours before moving on to other destinations planned by our expedition. Still, we hope that our findings there will now encourage anthropologists and Egyptologists to look for more direct links between this mysterious place and Nabta Playa.

BAGNOLD CIRCLE

We next headed southwest into the deep, open desert. Our destination was a mysterious stone circle discovered in 1930 by Ralph Alger Bagnold and thus known as Bagnold Circle. The stone circle was poorly documented and very little was known about it, but photographs encouraged us to suppose that it, too, like the Calendar Circle at Nabta Playa, could be some sort of prehistoric astronomical device.

Figure 4.14. Bagnold Circle in, top, 2008, and bottom, 1930

It took us two days of grueling travel in some of the most desolate places we had ever seen to reach Bagnold Circle. We wondered how Ralph Bagnold, in those days with vehicles that must have been very primitive by comparison, managed to come here through this testing terrain. Bagnold, who was a veteran of trench warfare in World War I, became a pioneer of deep desert exploration—especially, of the Sahara—throughout the 1930s. During World War II he was chosen to lead the British army's Long Range Desert Group. He was also a physicist who contributed valuable knowledge of the physics of blown sand, which is still used in planetary science research today.[30] He is credited with developing, for desert exploration, a sun compass that was not affected by magnetic anomalies. Bagnold's early expeditions in the Egyptian Sahara were in search of the fabled lost city of Zarzoura. It was on one such expedition in 1930, when he was traveling in the deep desert hundreds of kilometers southwest of Dakhla oasis, that he reported: "In a small basin in the hills we came the next day [October 27, 1930] upon a circle 27 feet in diameter of thin slabs of sandstone, 18 to 24 inches high. Half were lying prone, but the rest were still vertical in the sand. There was no doorway or other sign of orientation, and though we searched within and without the circle, no implements could be found.[31]

As we approached Bagnold Circle, we were keenly aware that no studies of its possible astronomical alignments had ever been conducted. As Wendorf, Schild, and Malville wrote in 2008, ". . . a well-known stone circle was discovered by Bagnold (1931 [*sic*] in the Libyan Desert. . . . No evidence of astronomical orientations had been reported, and none is readily discernable in photographs of the circle."[32]

Because of its incredible remoteness, few people have actually seen Bagnold Circle, let alone studied it in detail on location.[*32]

As far as we know it was not visited until the 1990s, when four-wheel-drive vehicles became available in Egypt and the military authorities slackened their rules for tourists' deep desert travel. In a 1998 visit by Zarzoora Expeditions of the Egyptian Wael T. Abed, the group apparently placed a cairn (small pile of stones) in the center of the circle. In 2001–2002, the Fliegel Jezerniczky Expedition (FJE) also visited Bagnold Circle. Additionally, Mahmoud Marai brought small groups to Bagnold Circle a few times from 2004 to 2007. It was Marai who guided us to Bagnold Circle in April 2008. Yet neither the Zarzoora Expedition nor the FJE checked for any possible astronomical alignments at Bagnold Circle—nor had anyone else, as far as we could tell.[*33] [33]

Bagnold Circle lies in a shallow basin, probably an ancient seasonal lake similar to the one at Nabta Playa.[†34] The physical features we noted first were two prominent, upright, and elongated stones (very reminiscent of the gate stones of the Calendar Circle at Nabta Playa) that defined an east–west alignment. One of these stones on the west side was white, and the stone on the eastern side was black, which may indicate a symbolic significance of some sort. For our GPS we took readings of this alignment as well as readings for the north–south alignment, which also had at each end a very dark-colored stone, nearly black, and a very light-colored stone, nearly white. The conditions of the stones suggest extreme age: they have been deeply scoured by millennia of wind erosion. Some of the stones have suffered such extreme erosion that their tops have fallen off and are still on the ground where they fell. Notwithstanding this erosion, the circle is remarkably well preserved, considering its vast age. The two alignments—east–west and north–south—strongly imply an

astronomical function for the Bagnold Circle.

Figure 4.15. Bagnold Circle north–south alignment

Another clue are twenty-eight stones that form the circumference of the circle, which is not only implicit of the lunar phase cycle of 29.5 days but, more important for us, also brought to our attention a clear connection to the Calendar Circle at Nabta Playa, which also had twenty-nine stones around its circumference. We also noted that north of the circle there was an elongated low hill that suggests observation of the low northern sky, possibly for marking the passage of a circumpolar constellation or star.[*35]

One of the most nagging questions that constantly comes to mind in this totally desolate and extremely remote place of the Egyptian Sahara is this: Why build anything here at all? What could have influenced the ancient people who roamed the deep desert to go to the trouble of constructing a stone circle in the middle of nowhere and, furthermore, to align it to the four cardinal directions? The answer, ironically enough, may actually be that they did so because of the location itself—or, to be more specific, of the latitude of the place. Today Bagnold Circle is approximately 23.5 degrees north and just a fraction north of the Tropic of Cancer.[†36]

Using the circle's precise latitude and checking the earth's ancient obliquity at various epochs, we found out that from 13,110 BCE to 1490 BCE, the circle was located just south of the Tropic of Cancer. This means that within that range of epochs the sun passed directly overhead exactly at the zenith a few days before and a few day after the summer solstice. This time of year was when the monsoon rains started drenching the desert and may be a reason—though perhaps not the only reason—for locating the stone circle here. We can recall from chapter 2 that in 1999 Carlo Bergmann discovered the Abu Ballas Trail, an ancient donkey trail that ran across the 500 kilometers (311 miles) of waterless desert between the Dakhla oasis and Gilf Kebir. Although anthropologists and Egyptologists have agreed that this trail was used by ancient Egyptians of the late Old Kingdom, Bergmann believes it was used as early as the Late Neolithic, about 5500–3400 BCE. Bagnold Circle is located a bit west of this trail, and it is quite possible that it served as a point for a shortcut route to Gilf Kebir, perhaps by the same Neolithic people who once populated Gilf Kebir and Jebel Uwainat.

We also found more evidence of prehistoric astronomy in the region when southwest of Bagnold Circle, 250 kilometers (155 miles) away in the wadi Karkur Talh region on the north of Jebel Uwainat at a latitude of 21.98 degrees north, we found an apparent solstice sunset marker. At a large rock face with western exposure, which contains glyphs of giraffes and human figures, there is an outcrop or mound on the cliff face about twelve feet high. Scrambling up the rock mound, we found on it a number of skillfully engraved marks, including an obvious arrow pointing toward the northwest horizon. Returning with our electronic compass we measured the arrow as pointing approximately 26 degrees north of west, for an azimuth of 296 degrees, which marks the sunset on the day of summer solstice. This type of skillfully engraved rather than painted art tends to be on the more ancient end of the spectrum of rock art in the region. Given that the rock face also contained images of giraffes, we estimate that this solstice marker may predate 6000 BCE. In addition, when we were en route from Bagnold's Circle to the Gilf Kebir region, traveling not far from the Libyan border, we came across a large, isolated standing stone that protruded more than 1 meter (3 feet) out of the ground. Located in the middle of a long, narrow, flat basin, or wadi, that was convenient for our jeeps to drive on because of its featureless flatness, this stone was smooth, cylindrically shaped, and standing only a few degrees off vertical. It appeared likely to

have been placed by humans, possibly as a gnomon with both solar and phallic allusions.

Figure 4.16. Isolated standing stone north of Jebel Uwainat, oriented slightly off zenith and possibly a prehistoric gnomon.

Bagnold Circle gives all indications of being from the Neolithic epoch. It is probably a vestige left by traveling pastoralists whose temporary settlements dot the desert region that lead from the circle to Gilf Kebir and, in all likelihood, had their permanent abode in the wadis and plateaus of the Gilf Kebir and Jebel Uwainat mountains. The similarities of both the stones and the astronomical alignments of the Bagnold Circle and the Calendar Circle at Nabta Playa strongly suggest that we are dealing with the same Late Neolithic people whose images are present in the rock art of Gilf Kebir and, more prolifically, at Jebel Uwainat. Further, at Jebel Uwainat, the engraved arrow that we discovered and that quite plausibly was intended to mark the summer solstice sunset was probably associated with the same extended cultural group. More explorations are necessary to find the human remains of these astro-ceremonialists and navigators of the Egyptian Sahara, but these findings contribute another important aspect to our story of how their knowledge of astronomy, desert navigation, rudimentary agriculture, and domestication of cattle were important elements in the creation of the pharaonic state when, around 3400 BCE, the Sahara became super-arid and forced these mysterious desert dwellers to migrate eastward into the Nile Valley.

Figure 4.17. Elevated horizontal rock face at the northern edge of Jebel Uwainat, with engraved linear features and arrow pointing to the summer solstice sunset

So, with such thoughts in mind, we set out on what was a scorchingly hot and rugged drive to Gilf Kabir. We will pick up this story at the end of chapter 5. Meanwhile we ask: Who were these mysterious people that populated the Egyptian Sahara in such remote antiquity? How did they look? Can we refer to them as Egyptians? Perhaps most intriguing of all, where had they come from in the first place?

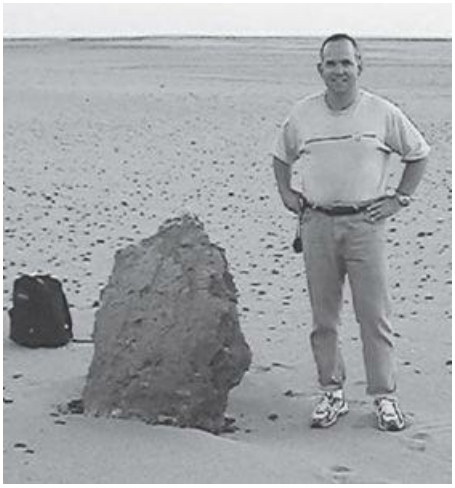

Figure 4.18. Thomas Brophy with aligned megalith AO, one of the few megaliths still standing in original position, 2003

5

THE BIBLE, THE HAMITES, AND THE BLACK MEN

Now this is the genealogy of the sons of Noah: Shem, Ham, and Japheth. And sons were born to them after the flood. . . . The sons of Ham were Cush, Mizraim (the name of Egypt), Put, and Canaan.

GENESIS 10:1–8

Because Ham's name meant both " black" and " hot," Ham's descendants had to come from Black Africa.

DAVID GOLDENBERG, *THE CURSE OF HAM: RACE AND SLAVERY IN EARLY JUDAISM, CHRISTIANITY AND ISLAM*

In practice it is possible to determine directly the skin color and hence the ethnic affiliations of the ancient Egyptians by microscopic analysis in the laboratory; I doubt if the sagacity of the researchers who have studied the question has overlooked the possibility.

CHEIKH ANTA DIOP

HAM, SON OF NOAH

In Egyptology, we frequently come across the term Hamites in connection with the origins of the ancient Egyptians. As we attempt to understand why and how the Hamites are associated with the ancient Egyptians, we are often led to the Bible and the story of Noah and his sons.

In the Book of Genesis, Ham is one of the sons of Noah. Ham's children are Mizraim, Cush, Put, and Canaan, but in the Bible the names of Ham's children are also used to denote geographical places: Egypt (Mizraim), Ethiopia (Cush), Libya (Put), and Palestine (Canaan). Many biblical scholars have proposed that the name Ham meant, in ancient Hebrew, "black" and "hot," implying that the Land of Ham was a warm, tropical region populated by Black people. The Land of Ham is thus often said to be that part of the world we call Black Africa (what has been thought of as sub-Saharan Africa). Naturally, as has always been the case with the etymology of Hebrew words in the Bible, there is a heated debate over whether this interpretation is correct, because in Genesis 9:20–25 another story is told of how Noah, while tending his vineyard, became drunk and fell asleep naked in his tent, and then Ham did something unspeakable to him,[*37] whereupon Noah cursed Ham through Ham's youngest son, Canaan. This so-called Curse of Ham (also known as the Curse of Canaan) has generated, as we might expect, all sorts of debate and various interpretations among fundamentalists of the Bible as well as racists. To confound the issue even further, in the Bible, the Land of Ham is also unequivocally associated with the land of the pharaohs—that is, Egypt, the traditional enemy of Israel: "Israel also came into Egypt, and Jacob dwelt in the land of Ham" (Psalm 105:23) and "They forgot God their Savior, who had done great things in Egypt, wondrous works in the land of Ham, awesome things by the Red Sea" (Psalm 106:21).

As we have just seen, in the Bible, the land of Egypt is also known as Mizraim, the name of one of Ham's sons. By implication, then, we can see how biblical literalists might conclude that the Egyptians were the descendants of Ham. At any rate, we can see all these biblical interpretations as fueling the neverending conflict between Israel and Egypt—a conflict that supposedly started with the Jews in captivity[*38] in Egypt at the time of Rameses II (ca. 1290 BCE) and ended in 1979 with the fragile peace treaty between Israel and Egypt—the so-called Heskem HaShalom Bein Yisrael Le Mizraim.

We can note that even today Jews refer to Egypt as Mizraim. Indeed, the Egyptians themselves call Egypt Mizr, clearly a derivative of Mizraim. Of course, biblical stories are not scientific evidence for the ethnic origins of the ancient Egyptians, but we cannot ignore the possibility that such stories may be partially rooted in actual history. In any case, in these biblical stories, the term Hamites, for better or for worse, has often been adopted by scholars, particularly

Egyptologists and anthropologists, in reference to the racial origins of the ancient Egyptians. Not surprisingly, this sort of labeling has generated much confusion and debate, not least by racists in Egypt and elsewhere, who are fearful of having Black Africa as the true origin of the ancient Egyptian civilization. A contemporary example of such fear is a description in a popular pocket travel guidebook: "Unfortunately, as in most developing societies, the world's population is usually categorized according to a cultural-racial hierarchy. White Westerners are at the top, Egyptians next, then Arabs, followed by Asians, and lastly Africans. While these attitudes are undoubtedly racist, they do not find violent expression toward poorer local Sudanese, for instance."[1]

Of course, such a racial hierarchy system is deplorable[2] to current sensibilities of modernity, and such a ranking is by no means universally adhered to by the Egyptian people.[*39] Yet evidence that the guidebook's point is somewhat accurate to many people's experience is the recurrent distribution of the guidebook and the fact that its reviewers do not seem to complain about the racial hierarchy description. And as we shall see, such cultural-racial value ranking has indeed played a role in shaping scholarly Egyptology.

THE HALF-HAMITES THEORY

A theory that was very popular in the late nineteenth and early twentieth centuries suggested that the Hamites were a Mediterranean people who had migrated to central or eastern Africa and interbred with the Negroes there to produce a Negroid-Hamitic race of black-skinned people with fine Caucasian-like features. Examples were thought to be the Tutsi and the Masai.[3] For example, in 1930 the British ethnologist Charles Gabriel Seligman even claimed that the Hamites were a subgroup of the Caucasian race and that all the major achievements of the African people were, in fact, the result of Hamites who had migrated into central Africa as Europeans and brought along with them all the know-how of civilization, which they then passed on to the inferior Black race.[4] In other words, the alleged Black Hamites were the product of a purer and superior Hamitic race. The conclusion was therefore that the Black Hamites should be regarded as superior to the "black negroes" by virtue of their alleged Mediterranean or Caucasian origins. According to C. G. Seligman,

> Apart from relatively late Semitic influence . . . the civilizations of Africa are the civilizations of the Hamites, its history is the record of these peoples and of their interaction with the two other African stocks, the Negro and the Bushmen, whether this influence was exerted by highly civilized Egyptians or by such wider pastoralists as are represented at the present day by the Beja and Somali. . . . The incoming Hamites were pastoral "Europeans"—arriving wave after wave—better armed as well as quicker witted than the dark agricultural Negroes.[5]

These false and rather blatantly racist views were finally challenged by many scholars in the 1950s and '60s, but so deep-rooted was the belief that Black Negroes were inferior to Black Hamites that such views are still entertained by some misguided and uneducated people, making it difficut to remove them once and for all. We must recognize, of course, that the Hamite controversy is not a simple one and that there are many gray areas in this debate that are far too complex to do full justice to them here. Suffice it to say, however, that until very recently the very idea that an advanced Black race from sub-Saharan Africa was at the source of the ancient Egyptian civilization, and perhaps even of all civilization, was disturbing to many Western people and was pure anathema to those who held Eurocentric views. Thus we still find in textbooks the dubious Mediterranean or Levantine or Sumerian-Babylonian labels listed to explain the origin of the ancient Egyptians, while precious little is said of the far more plausible Black African influence. True, some Egyptologists do at times express their opinions that there could be a central African or east African origin of the ancient Egyptians, but such views are diluted by the use of such terms as Hamitic, Half-Hamitic, and Hamitic pastoralists that still imply a Mediterranean European origin. For example, Henry Frankfort, the renowned director of the prestigious Warburg Institute and professor of preclassical history, uses such terminology when he writes, ". . . somatic and ethnological resemblances, and certain features of their language, connect the ancient Egyptians firmly with the Hamitic-speaking people of East Africa. It seems that the Pharaonic civilization arose upon the north-east African Hamitic substratum"[6] and "the profound significance which cattle evidently possessed for the ancient Egyptians allows us to bring an entirely fresh kind of evidence to bear on the problem. . . . In the life of the Hamites or Half-Hamites, cattle played an enormous part . . .,"[7] and ". . . that North and East African substratum from which Egyptian culture arose and which still survives among Hamitic and half-Hamitic people today."[8]

Even allowing that scholars tend to think that lexicological complexity is a requirement of academic writing, we note that the term "Black African" is clearly avoided by the otherwise very open-minded professor Henry Frankfort. It seems that such jargon is unfortunately still used to avoid directly stating that there is a Black African origin of the pharaohs' culture and race. In addition, after Champollion deciphered the hieroglyphs in 1822, scholars who monopolized Egyptology were not scientists but classicists, historians, linguists, and humanists, as we have seen in chapter 1. These academics held ancient Greece as the source of all cultural achievements. As such, Egyptologists of the nineteenth and early twentieth centuries were very different from those of today, who are, by and large, unbiased and more scientifically minded. In those early days of Egyptology, the tendency was to consider the first dynasty of pharaohs (ca. 3100 BCE) to be the actual origin of the ancient Egyptian civilization. No hard evidence suggested earlier or different origins for the so-called dynastic period.

Finally, however, in the 1920s, British Egyptologist Flinders Petrie began to cause a breach in this consensus. Petrie's excavations revealed evidence of what, at first, appeared to him as a completely different culture—in fact, so different from that of the dynastic Egyptians that he mistook it for the culture of a new race that had come from outside Egypt to cohabitate with more primitive people in the Nile Valley. Further investigations eventually showed that this was not a new race at all, but rather an older, prehistoric phase of the Egyptian culture. Petrie and his fellow Egyptologists were baffled by the distinct difference between this prehistoric or predynastic people and the early dynastic people of the Egyptian civilization. Unable to explain how the ancient Egyptians appeared to have started their civilization with a fully formed language, a complex system of writing, an advanced science, a very mature and sophisticated religion, artwork that nearly surpassed classical Greek art, monumental architecture that still astounded the world, and construction engineering and technology that would tax even modern contractors, Egyptologists theorized that some superrace of invaders had come into the Nile Valley and kick-started the civilization for the Egyptians. This alleged super-race was thought to have come from the east, fueling the popular view that it was in the Orient, especially in Mesopotamia, that we could find the birthplace of the Egyptian civilization. We can be thankful that this theory began to lose hold when evidence began to mount that pointed to, as a root for ancient Egypt, a homegrown civilization—probably one with some influence from the prehistoric pastoralists in the adjacent eastern and western desert regions. This is more or less the position of many Egyptologists today, even though the evidence, as we will see, is stacking up in favor of an origin outside the Nile Valley—somewhere in the far west, not east, of the river, and pointing toward the distant corner with Sudan and Libya that leads into sub-Saharan, Black Africa.

BLACK ATHENA

To be fair, it is also true to say that today there is an uneasy feeling among more open-minded Egyptologists about this racial origin issue—a sense that their older peers could have been wrong and that the notion of a Black African origin for ancient Egypt ought to be given serious consideration. In other words, Egyptologists today are hedging their bets and are also wary not to be drawn into a huge cultural blunder and fall into the same intellectual grave that their older peers dug with their own hands.

We can take, for example, the case of *Black Athena* of the late 1980s. Martin Bernal, a professor emeritus of Near Eastern Studies at Cornell University, developed a deep interest in Egyptology through the influence of his grandfather, the eminent Egyptologist Sir Alan Gardiner. Bernal's quest began when he was intrigued by a strange paradox in Egyptology: though many ancient Greek scholars insisted that the Greeks had received much of their knowledge from the Egyptians, Egyptologists insisted that it was the Egyptians who had received much of their knowledge from the Greeks. Bernal openly proposed that modern Egyptologists should let the ancient Greeks speak for themselves; they should take seriously their claims rather than see them as fanciful stories. In 1987 Bernal published *Black Athena,* a three-volume opus in which he argued in favor of an "Afro-Asiatic" origin for the Egyptian civilization and, by implication, the same for the Greek civilizations. He openly denounced the Eurocentrism of the late nineteenth and twentieth centuries, arguing that it was not supported by scientific evidence.[9] A heated academic debate ensued between the Eurocentrics and the Afrocentrics. Egyptologists pulled rank and accused Bernal of poor scholarship and lack of evidence to support his theory. Cambridge Egyptologist John Ray accused Bernal of confirmation bias, and Egyptologist James Weinstein claimed that Bernal was ignoring archaeological evidence by relying only on Greek reports—thereby implying that the reports of modern Egyptologists were somehow more reliable. So persistent and effective were these attacks on Bernal's scholarship that today the mere mention of *Black Athena* in academic circles is anathema, even heretical, and Afrocentrism is considered a pseudoscience and, to some, even a dangerous practice. One of the most zealous opponents of Afrocentrism is Clarence Walker, professor of Black American History at the University of California, Davis.

Ironically, Walker is himself a Black American who was born in Texas. According to Walker, "Afrocentrism is a mythology that is racist, reactionary, and essentially therapeutic. . . . [It] places an emphasis on Egypt that is, to put it bluntly, absurd. . . . There is no evidence that the ancient Egyptians were black as we understand that term today."[10]

The born-and-bred-American Walker insists that he is not African, that he has never been to Africa and has no desire to go there. He sees himself as "an old-fashioned intellectual critic" and adds, "I don't like a lot of work being done in the field. . . . Just because you want to believe the world was created by black people doesn't make it so . . ."[11] Actually, though many may disagree with Walker about the ancient Egyptians, it is possible to find admirable the fact that he does not think his own Blackness should affect his scholastic conclusions. This may be a hopeful indicator that personal ethnicity should not affect our scientific or scholarly conclusions. Further, perhaps there is a problem of terminology—it may be accurate to label these commentators as Afrocentrists, for Afrocentrism is a pseudoscience, but only in the same way that Eurocentrism should be considered a pseudoscience. Both imply an attempt to fit data and observations into a box of preconceived notions. If the data, on balance, indicates that the people who originated the pharaonic civilization of Egypt were indeed Black Africans, then drawing such a conclusion need not be labeled Afrocentric or anti-Eurocentric—it may be thought of simply as accurate.

THE OUT OF AFRICA EVE

Ironically, in spite of views such as those of Clarence Walker, scientists in the field of genetics have been pointing out that it may actually be correct to say that the world was created by Black people. In 2009, more than a century after the exploration of darkest Africa by Livingstone, Burton, Stanley, and others, the BBC aired a documentary series titled *The Incredible Human Journey.* In the series, introduced to a wide British public, was the notion that all human beings alive today have their origins in Africa—indeed, that these origins can be traced to a single Black African woman, the so-called Out of Africa Eve. This view is now widely held by scientists, and it is also called the Mitochondrial Eve hypothesis, because it traces the ancestral lineage of humans back through the mitochondrial DNA, which is passed on only from the mother. This hypothesis was first published by a team of University of California biochemists in *Nature* magazine in 1987.[12]

Mitochondrial Eve: Mitochondrial DNA exists in human cells outside of the cell nucleus in membrane-enclosed organelles called mitochondria and contains a genome that is independent of the nuclear DNA genome. At conception mitochondrial DNA is passed on separately from the nuclear DNA, with mitochondrial DNA transmitted only from the mother without combination from the father. Thus mitochondrial DNA passes from generation to generation with very little change, only infrequent mutations change the mitochondrial DNA over time. Genetic scientists realized if they could measure the variance (set of all differences) among currently living humans, and if they could estimate the mitochondrial DNA mutation rate, then they could estimate the "origin time" from which all of today's humans' mitochondrial DNA must have come. The logic is sort of similar to the way the "big bang" creation of the universe was first discovered—astronomers observed that all distant galaxies were moving away from each other and then measured the rate at which the galaxies are now moving apart and simply turned the clock backward to when the galaxies would have all been in the same place, about fourteen billion years ago, and called that the "big bang." For mitochondrial DNA, geneticists measured the currently existing variance in humans around the world, and they estimated the mitochondrial DNA mutation rate, and running the genetic clock back in time gave a human mitochondrial DNA origin date of about 200,000 years ago—this is called the "Mitochondrial Eve," and geographic details of the mitochondrial DNA variance point to that origin location as east-central Africa. Mitochondrial "Eve" is the most recent human woman from whom all living humans today have at least one unbroken matrilineal line. Eve was not alone though. There were many human women alive at the time who share ancestry to living people today, but for all of them other than Eve their descendant lineages contain at least one man (who did not pass the mitochondrial DNA). In fact nuclear DNA analyses indicate that human population never dropped below a few tens of thousands (e.g., Naoyuki Takahata, "Allelic Genealogy and Human Evolution," in *Molecular Biology and Evolution,* January 1993, vol. 10, no. 1, pp. 20–22). As is the big bang in astrophysics, the Mitochondrial Eve is considered nearly settled science in genetics. But controversies do remain, especially involving uncertainties in the DN A mutation rate (e.g., Christopher Wills, "When Did Eve Live? An Evolutionary Detective Story," in Evolution, 1995, vol. 49, pp. 593–607). Similar studies of male Y-chromosomes place the most recent common male lineage ancestor, or "Y-Chromosomal Adam," several tens of thousands of years more recent than Mitochondrial Eve (e.g., Yuehai Ke, et al., "African Origin of Modern Humans in East Asia: A Tale of 12,000 Y Chromosomes," in Science,

May 11, 2001, vol. 292, no. 5519, pp. 1151–53). Interestingly, statistical genealogical studies separate from genetics indicate that the most recent common ancestor of all people alive today was much more recent than Mitochondrial Eve, and Y-Chromosomal Adam, probably within the past few thousand years (e.g., Douglas L. T. Rohde, Steve Olson, and Joseph T. Chang, "Modelling the recent common ancestry of all living humans," Nature, 30 Sept. 2004, vol. 431, pp. 562–65). Such a more recent common ancestor is consistent with the 200,000 year ago Mitochondrial Eve who was the most recent unbroken matrilineal ancestor.

In one of the BBC episodes, the presenter, Alice Roberts, who is also a lecturer in anatomy at the University of Bristol, explains that a "complex-looking DNA-based 'family tree' shows how twenty-firstcentury Europeans, Australians and the rest can all be traced back to the same black African population."[13] Roberts further explains, with refreshing candor, that "'population' . . . is the word we should be using instead of 'race.' I wouldn't use the word 'race.' Biologically, it doesn't make sense. It's a bizarre mismatch of concepts: culture, history. . . . Genetically, a white Scandinavian and someone from sub-Saharan Africa are very similar. In fact, humans have less variation genetically than chimpanzees. It makes you realize that all the historical attitudes towards different races are scientifically meaningless."[14]

The genetic evidence, bolstered by more recent refinements,[15] lends support to the Out of Africa Eve hypotheses for human migration, as opposed to the Multi-Regional hypothesis. In a book accompanying the BBC show, Roberts cites the work of the Oxford professor Stephen Oppenheimer, who describes the Out of Africa Eve story of humankind as going something like this:

> *Homo Sapiens,* modern humans, lived ca. 160,000 BC with the earliest mt-DNA and Y-chromosome ancestors found in East Africa. Four groups of hunter-gatherers travelled out southwest towards the Congo and west to the Ivory Coast, south towards the Cape of Good Hope, and northeast towards the Nile. Around 125,000 BC one group moved northwards down the Nile and into the Levant, but due to a climatic upheaval around 90,000 BC this group died out. A global freeze turned the Levant and North Africa into extreme desert. Around 85,000 BC another group crossed the entrance of the Red Sea in the south and into the Arabian Peninsula to reach the Indian sub-continent. They then spread to Indonesia and reached southern China by 75,000 BC. By ca. 65,000 BC they had spread to Borneo and Australia. Warmer climatic condition around 50,000 BC allowed a group to move again northwards through the Levant, cross the Bosporus and reach Europe. By 25,000 BC the ancestors of the Native Americans crossed the Bearing land bridge into Alaska and then spread into North America. By 10,500 BC they had spread also into South America. Between 10,000 and 8,000 years ago the Levant group moved back into the now-green Sahara.[16]

We can note that what remains to be explained is anomalous evidence for the later parts of that story, such as the fact that archaeological evidence for dating the earliest South Americans keeps moving back in time, which indicates that they may have crossed the oceans by boats, for example. In addition, Roberts's story is a mixture of the genetic, archaeological, and anthropological evidences, all of which are subject to new results and improvements. Yet some version of the basic Out-of-Africa-Eve view—that all humans alive today share one female ancestor from Africa who lived roughly two hundred thousand years ago—is the currently prevailing notion among scientists. It is possible, then, that while this human journey was going on, the early modern humans of east Africa moved northward into Chad and settled in the Tibesti-Ennedi highlands. From there, perhaps around 9000 BCE, they started moving north again into the then inviting, green Egyptian Sahara, probably going first to the Gilf Kebir and Uwainat mountain region, then slowly spreading east and northeast toward the Nile. Another group moved westward from central Africa into the green Tenere Sahara of Niger as well as into the fertile Aïr Mountains farther west. It is possible that around 8000 BCE these black-skinned people in the Egyptian Sahara encountered an incoming Mediterranean group that had returned to North Africa from Europe via the Levant. This may perhaps explain why Romuald Schild and Fred Wendorf of the CPE found in the skeletal remains at the prehistoric cemetery of Gebel Ramlah near Nabta Playa two racial groups, one made up of sub-Saharan Black pastoralists and the other of Mediterranean or North African ethnology.[17] Then, starting around 5000 BCE, as the Sahara became drier, these people began moving out of the desertified regions. Finally, by 3500 BCE, the desert became superarid and forced them to migrate eastward into the Nile Valley. If this is true—and it does very much appear to be the case—then the origins of the ancient Egyptians are rooted in a black-skinned race of sub-Saharan

pastoralists that had themselves likely come from the Tibesti-Ennedi highlands and, going further back in time, had their source in eastern Africa. In other words, the evidence is overwhelmingly in favor of a black-skinned African origin for the Egyptian civilization.

Yet is it possible to prove this via some sort of direct measurements?

IT IS ALL IN THE MELANIN

A great advocate of the African origins model as well as a believer in the Black African origins of the ancient Egyptians was the Senegalese anthropologist and radiocarbon physicist Cheikh Anta Diop. Hailed by many as one of the greatest African historians, Diop was studying for a physics doctorate in Paris in 1951 when he caused a huge stir at the university because his Ph.D. thesis on the Black African origins of ancient Egypt was rejected as unsuitable by his assessors. Not being easily discouraged, Diop boldly labored for nine more years to make the evidence in his thesis so airtight that, when he resubmitted the thesis again, this time it was grudgingly accepted. Hardened by those struggles and the bias he encountered against the African origins idea, Diop went further and published his thesis under the title *Nations Nègres et Culture,* and very soon he became a national hero and the major defender of the African origins theory. In his native country of Senegal, Diop founded the Radiocarbon Laboratory at the University of Dakar, became its first director, and used this cutting-edge technology to continue his research on the ethnic origins of the Egyptian civilization. Diop's argument was simple and straightforward: it was possible to know the skin color of an ancient corpse by microscopic analysis of the melanin content in the body. His critics countered by saying that this method was not foolproof and that possible contamination of the embalming unguents and the deterioration of the corpse over the centuries made the result dubious, but these objections were in turn addressed by Diop. In 1974 Diop presented his findings to a large number of professional Egyptologists and anthropologists at the People of Ancient Egypt symposium in Cairo organized by UNESCO World Heritage. He was largely ignored. Diop died in 1986, leaving behind numerous publications as well as recorded interviews on radio and television. Following is a concise overview of Diop's thesis.[18]

Figure 5.1. Cheikh Anta Diop.

DIOP AND THE CAUSE OF HIS STRUGGLES

Diop starts by recounting that in 1971 the Kenyan anthropologist Louis S. B. Leakey, in his final report at the Seventh Pan-African Congress of Prehistory at Addis Ababa, proved that more than one hundred fifty thousand years ago humans that were morphologically similar to us were living in central Africa around the great lakes that feed the Nile. Diop explains how this starling discovery opened a reappraisal of the ethnology of the ancient Egyptians and humankind as a whole. Leakey even thought he had found the very spot where the adventure of modern man had begun: the beautiful, snow-capped Rwenzori Mountains between Uganda and the Democratic Republic of Congo, traditionally known as the Mountains of the Moon and discovered by Henry Morton Stanley in 1885. These mountains stand between Lake Albert and Lake Edward and are the highest source of the Nile River. *Rwenzori* means "rainmakers," a name inspired by the almost permanent rain clouds that cover the peaks of these mysterious mountains. According to Leakey, humans dispersed from here to inhabit the rest of Africa and, eventually, the whole planet. The implication was that modern humans, being from a warm and humid climate that caused the natural melanin in their pigmentation to darken, were originally black-skinned Africans. It was, therefore, from this Black stock that the other races of humans were formed. Other than migrating southward, eastward, and westward, these original humans could also go northward to two main

regions: the Nile Valley and the vast, then green Sahara.

Starting from the late Paleolithic age the entire Nile Valley, from southern Sudan to northern Egypt, was populated by a Negroid people. Similarly, the northwest region of Africa that is today the Sahara was also populated by these same Negroid people. Diop rejected the claim by some anthropologists that ancient human skulls from Nagada in Lower Egypt and Abydos and El Amra in Upper Egypt exhibit not only Negroid but also Germanic features. He pointed out that similar skulls from well-known Black people such as the Ethiopians and Dravidians also exhibit the same characteristics but are clearly not Germanic. Diop also pointed out that finding non-Negroid features in skulls does not necessarily mean that living individuals were white. In Egypt some 1,787 skulls, dating from the predynastic period to the present day, were examined and found to be 36 percent Negroid, 33 percent Mediterranean, 11 percent Cro-Magnon, and the rest uncertain but most probably also Negroid. This shows, says Diop, that the original and pure Black Negroid race that first inhabited Egypt eventually merged with a Mediterranean race to create the Egyptians that we know today.

Diop also rejected Flinders Petrie's method of using symbolic images from ancient palettes to classify predynastic and protodynastic Egyptians into six racial types: an aquiline type, which he equated to white-skinned Libyans; a plaited-beard type, which he equated to originating on the Red Sea; a sharp-nosed type, which he equated to coming from central Arabia; a tilted-nose type, which he equated to coming from Middle Egypt; and a jutting-beard type, which he equated to coming from Lower Egypt. Diop points out that even if we accept such simplistic classifications, current Egyptology textbooks at best ignore the issue of racial origins or, at worst, flatly assert that the ancient Egyptians were white, leaving the lay reader with the false impression that such assertions are based on solid research—which, of course, they are not. Thus generations of readers have been misled to the false belief that the ancient Egyptian civilization owes little or nothing to Africa. Diop accuses Egyptologists of going "around the difficulty today by speaking of red-skinned and black-skinned whites without their sense of common logic being in the least upset."[19] He argues that in ancient times, the Greeks referred to all of Africa as Libya, which was a misnomer *ab initio,* because Africa contains many other peoples besides the so-called Libyans, who belong among the whites of the northern or Mediterranean periphery. Diop was justifiably repulsed by a textbook intended for middle and secondary school that explained that "a Black is distinguished less by the color of his skin than by his features: thick lips, flattened nose . . ."[20] Diop points out that many of the reliefs and murals from predynastic and early dynastic times in Egypt show

> . . . the native-born blacks subjugating the foreign intruders into the valley . . . wherever the autochthonous racial type is represented with any degree of clearness, it is evidently Negroid. Nowhere are the Indo-European and Semitic elements shown even as ordinary freemen serving a local chief, but invariably as conquered foreigners. The rare portrayals found are always shown with the distinctive marks of captivity, hands tied behind the back or strained over the shoulders. A protodynastic figurine represents an Indo-European prisoner with a long plait on his knees, with his hands bound tight to his body. The characteristics of the object itself show that it was intended as the foot of a piece of furniture and represented a conquered race.[21]

Diop argues that the two variants of the Black race—the straight-haired Dravidians in Asia and the Nubians and Tebu, and the kinky-haired humans from the Equatorial regions—are found in the modern Egyptian population. Diop's silver bullet, however, was the proven scientific method that can determine skin-color by the analysis of the melanin content in mummies from ancient Egyptians—and he insists that, contrary to the words of Egyptologists, it was entirely possible to determine the melanin content of ancient mummies by microscopic analysis in the laboratory. Melanin, or, more precisely, eumelanin, is a naturally produced polymer responsible for skin pigmentation. It is insoluble and can be preserved for millions of years, such as in the skins of fossilized creatures. Diop claimed that it can be measured in the skin of Egyptian mummies. Even though Egyptologists lament that the skin of mummies is tainted by embalming material and thus is no longer susceptible to such analysis, Diop rejected this by showing that although the outer epidermis is where the melanin is usually found, melanocytes are particles deeper in the skin where they are not destroyed by the mummification process. From samples of common Egyptian mummies from the Musée de l'Homme in Paris, Diop was able to show high melanin levels that are not found in white-skinned people. Diop wanted to apply the same analysis to royal mummies kept in Egypt, but the Egyptian authorities refused to give him any samples—not even the few millimeters of skin tissue that are required for such analysis.

Another criterion, which had proved successful in the past in determining racial origins, is the so-called Lepsius Canon. This entails examining the bones of mummies' bodies rather than their skulls. According to Diop, this method shows that the "bodily proportions of the ideal Egyptian was short-armed and of Negroid or Negrito physical type."[22] In

addition, Diop suggests that blood groups could be used, for even today's modern Egyptians, especially those in Upper Egypt ". . . belong to the same Group B as the populations of western Africa on the Atlantic seaboard and not the A2 group characteristic of the white race prior to any crossbreeding. It would be interesting to study the extent of Group A2 distribution in Egyptian mummies, which present-day techniques make possible.[23]

Diop also reviewed the various statements made by ancient Greeks and Romans who visited Egypt, as did Martin Bernal later in *Black Athena.* Diop asserts that if we accept what the ancient Greek and Roman writers say—and frankly, there are no good reasons why we shouldn't—then we must conclude that the ancient Egyptians were black-skinned, for these writers leave us with no doubt that they saw the Egyptians as "dark" or "black" men. Egyptologists, on the other hand, insist that we should not take seriously these ancient writers. A few Greek and Roman writers make clear Diop's point.

Herodotus (ca. 450 BCE), the father of history, states that ". . . it is in fact manifest that the Colchidians are Egyptian by race . . . several Egyptians told me that in their opinion the Colchidians were descended from soldiers of Sesostris. I had conjectured as much myself from two pointers, firstly because they have black skins and kinky hair . . ."[24] Herodotus also used the fact that the Egyptians were Black in order to prove that the oracle of Dodoni in Epirus, which according to legend was founded by a Black woman, was Egyptian in origin: ". . . and when they add that the dove was black they give us to understand that the woman was Egyptian."[25]

In one of the works of Aristotle (ca. 320 BCE) the great philosopher and father of scientific thinking speaks rather derogatorily about the Egyptians but nonetheless shows that he too regarded them as black-skinned: "Those who are too black are cowards like, for instance, the Egyptians and Ethiopians. But those who are excessively white are also cowards as we can see from the example of women . . . the complexion of courage is between the two (brown or tanned)."[26]

Aeschylus (ca. 480 BCE), in his play *The Suppliants,* has one of the protagonists, a certain Danaos, comment on an Egyptian ship: "I can see the [Egyptian] crew with their black limbs and white tunics."[27]

Apollodorus (ca. 70 BCE) affirms that "Aegyptos conquered the country of the black-footed ones and called it Egypt after himself."[28]

Another Greek writer, Lucian (180 BCE), presents a dialog between two Greeks, Lycinus and Timolaus, discussing a young Egyptian boy. "Lycinus: This boy is not merely black; he has thick lips and his legs are too thin . . . his hair worn in a plait behind shows that he is not a freeman."[29]

Statements by many other ancient Greek and Roman writers provide similar confirmation, either directly or indirectly, that the ancient Egyptians were black-skinned.[30] Interestingly, before racial and cultural bias affected European scholars, many European travelers such as Constantin-Francois Volney, who journeyed in Egypt in 1783–1785, wrote honest statements: ". . . on visiting the Sphinx, the look of it gave me the clue . . . beholding that head characteristically Negro in all its features, I recalled the well-known passage of Herodotus which reads: 'For my part I consider the Colchoi are a colony of the Egyptians because, like them, they are black skinned and kinky-haired . . .'"[31]

Champollion-Figeac, the brother of the famous Champollion the Younger, who deciphered the hieroglyphics, wrote this bizarre response to Volney's observations: ". . . Volney's conclusion as to the Negro origin of the ancient population of Egypt is glaringly forced and inadmissible."[32]

Diop approaches the argument from a different and in some ways better perspective by asking how the ancient Egyptians viewed themselves. He notes that they referred to themselves as the Rmt-en-Km-t, which Egyptologists usually translate as People of the Black Land,[33] because, they say, the ancient Egyptians were not referring to themselves but rather to the color of the alluvial soil of the Nile Valley, which has a dark, almost black tint. Diop argues, however, that it makes far more sense to translate this term as Land of the Black People. Indeed, Km-t is perhaps the origin of the Biblical name Ham (hence Hamite), which also means "black." The *H* and *K* in the Semitic dialects are often mingled to create the guttural *Kh.* Thus the Hebrew *Kh-am* may be a derivative of the earlier Egyptian *Kh-em.* This would certainly explain why in the Bible, Egypt is often called the land of Ham or Khem. Diop also presents an array of epithets of divinities of ancient Egypt that associate them with the color black implicitly, if it's not explicitly stated that they were black-skinned,[34] and he also presents a variety of other arguments involving complex linguistic comparisons and word syntax of the ancient Egyptian language and other African languages, but such arguments are well outside the scope of our investigation.

At any rate, suffice it to say that the evidence presented by Diop overwhelmingly supported a Black African origin for the ancient Egyptians. As we have said earlier, Diop's crowning moment was at the UNESCO Symposium in January 1974 in Cairo, where he and a colleague, Professor Obenga, carefully presented their scientific findings to a large audience of Egyptologists and anthropologists from all parts of the world. It was nevertheless stated in the conclusion of the report of the symposium: "Although the preparatory working paper sent out by UNESCO gave particulars of what was desired, not all participants had prepared communications comparable with the painstakingly researched contributions of Professors Cheikh Anta Diop and Obenga. There was consequently a real lack of balance in the discussions."[35]

The attending Egyptologists had not even bothered to prepare for a proper and balanced debate. Their biased conviction was so entrenched that they merely listened politely and then ignored the issue at hand. The UNESCO organizers, however, were clearly impressed by Diop and commissioned him to write the entry on the origins of the pharaohs in their *General History of Africa* published a few years later, in 1981. Yet the archaeologist Ahmed Mokhtar, who, ironically, was the editor of this UNESCO publication, could not prevent himself from adding a note in the introduction of the report: "The opinions expressed by Cheikh Anta Diop in this chapter are those which he developed and presented at the UNESCO symposium of 'The People of Ancient Egypt,' which was held in Cairo in 1974. The arguments put forward in this chapter have not been accepted by all the experts interested in this problem."

Notwithstanding Ahmed Mokhtar's odd remarks about a colleague and contributor to the UNESCO publication, what he said did not take into account the fact that some very senior French Egyptologists—notably Professors Jean Vercouter and Professor Jean Leclant—had been very impressed with Diop's professional presentation. In reality the resistance to accept or even consider Diop's thesis came not from Egyptologists in general but specifically from high Egyptian officials, as is well demonstrated by Dr. Zahi Hawass, the present chairman of Egypt's Supreme Council of Antiquities (SCA) and undersecretary of state to the Ministry of Culture. Hawass is well-known for his aggressive attitude toward those who oppose him so that even the normally discreet *Sunday Times* of London felt compelled to write: "He rules Egyptology with an iron fist and a censorious tongue. Nobody crosses Zahi Hawass and gets away with it. . . . Nobody of any standing in Egyptology will come out to help you . . . because they'd lose their jobs. Sadly, people are cowering round his ankles. . . . The hugged ankles belong to the most powerful man in archaeology, Dr Zahi Hawass, aka Big Zee, secretary-general of Egypt's Supreme Council of Antiquities (SCA). It is Hawass who holds the keys to the pyramids, the Valley of the Kings, the Sphinx, Abu Simbel, everything. No Egyptologist gets in without his permission, and few will chance his anger. . . ."[36]

More on Hawass

More recently, the *New York times* was even more candid about Dr. Hawass's behavior to colleagues, students, and other researchers.

> Zahi Hawass, secretary general of the Supreme Council of Antiquities in Egypt, seems to get his name in the papers and his face on television every time anyone sticks a shovel in the ground there. The resulting fame—the man has become ubiquitous on history-heavy American cable channels—has apparently given Dr. Hawass, like many celebrities before him, the mistaken impression that any sort of personal behavior will be embraced by his adoring public, because he sure is obnoxious on "Chasing Mummies," an annoying new show that begins Wednesday night on History. Dr. Hawass has allowed a History crew to tag along as he does what he does, but, at least from the evidence of the premiere, this does not result in many revelations about the science of archaeology. It results instead in a fair amount of footage of Dr. Hawass verbally abusing those around him: the film crew, college-age interns who have come to worship at his feet, and so on. Any infraction, or no infraction at all, seems sufficient to warrant one of Dr. Hawass's tirades.[37]

We have experienced Hawass's anger since early 1994, when our first book, *The Orion Mystery,* was published. He branded Robert Bauval and his colleagues as liars, amateurs, pyramidologists, pyramidiots, and, befuddling as it may seem, even Zionists who were trying to steal the pyramids. In fact, when it comes to the ethnic origins of the ancient

Egyptians or who built the pyramids, Hawass has issued some rather odd statements. For example, when, in 2002, a small robot was used to explore narrow shafts in the Great Pyramid of Giza, he told a bemused journalist of the popular *Al-Gomhoreya* newspaper: "The results of the robot's exploration refute the allegations reiterated by Jews and some Western countries that the Jews built the pyramids!"[38]

Hawass's superior, Egypt's Minister of Culture Farouk Hosni, made a very similar bizarre statement: "Israeli allegations that they built the Pyramids abound, and we must face up to this even if it triggers a crisis with Israel! This is piracy! Our history and our civilization must be respected but the Israelis want to take over everything! We must counterattack with full strength because this is how they took Palestine. They keep on saying Palestine belongs to them and now they are doing the same with the Pyramids!"[39] Further, Hawass added to this: "A group of people are making an organized campaign. There are some people pushing them [Israel]. . . . These people are waging a big attack against us. I swore two years ago that I would not reveal their names, but I found out that I must mention them because it is becoming a threat . . . there is among us a bad person, a Jew . . . and I will tell the public that everyone who tries to talk against the Egyptians should shut their mouths!"[40]

According to Hawass, a member of the group allegedly waging a "big attack" backed by Israel against the Egyptians is Robert Bauval. Bauval is a Christian, not a Jew, and, ironically, he was born and raised in Egypt.[*40]

In a more recent television interview in February 2009, Hawass unabashedly claimed that the Jews "control the entire world" and that ". . . for eighteen centuries they [the Jews] were dispersed throughout the world . . . they went to America and took control of its economy . . . they have a plan: Although they are few in number, they control the entire world . . . look at the control they have over America and the media!"[42]

Needless to say, with this type of display by the chief of the SCA, any claim, however scientific and scholarly, of a Black African origin for Egypt's ancient civilization will inevitably be met with indifference and, more likely, with opposition. Indeed, Hawass has already made this quite clear with his latest commentaries on this issue to the official Egyptian MENA News Agency: ". . . the portrayal of ancient Egyptian civilization as black has no element of truth to it! Egyptians are not Arabs and are not Africans despite the fact that Egypt is in Africa . . . !"[43]

According to this kind of logic, though Egypt is in Africa, Egyptians are not Africans. Such blatant contradiction most likely stems from the fact that Hawass probably equates Africans and Blacks. Therefore, any connection between the ancient Egyptians and Blacks or Africans must be rejected at all cost, even if it contradicts geographical realities. Perhaps this extreme view clarifies other, less blatant but still puzzling attacks that scholars have made in their academic publishing. Facts, however, are facts: Egypt is in Africa, Egyptians are Africans, and there is now overwhelming evidence that ancient Egyptians have a Black African origin.

Rejection of an Article

In early 2008, Thomas Brophy, together with another coauthor, submitted to an academic journal a paper about a small part of the proposed astronomy of Nabta Playa. The journal returned it with a critical review from an anonymous referee (perhaps from an Egyptian scholar) who, in the course of recommending that the journal reject the paper, actually referred to Brophy and his colleagues as "behaving like arrogant Westerners." We were puzzled by that strange comment. Why, we thought, would an accomplished scholar make such a personal attack within the formal review process? It seemed out of context. Then it dawned on us: perhaps he was speaking from a perspective formed partly by a racially hierarchical worldview. If this was true, it would be natural for him to have a sort of chip on his shoulder about Westerners. In Brophy's paper, as far as we were thinking at the time, we were simply proposing a solution to an astronomy puzzle. He and his colleagues made no mention of or concerned themselves with any contemporary racial-cultural implications of their paper. Yet we now understand why those innocent suggestions about astronomy at Nabta Playa may have been perceived as a threat.

At this point, we must state categorically that we are not trying to steal the pyramids, we are not claiming to have built the pyramids, and we are not claiming that our friends and family—or even our ethnic group—built them. We say this with tongue in cheek, of course—hoping that the SCA director will make room for some humor and a broader

perspective. We must also acknowledge that Dr. Hawass, as a deputy minister of the Egyptian government, could well be under pressure from various contemporary sociopolitical sources. It is reasonable, then, to suppose that not all of his commentaries are motivated purely by dispassionate analysis of events from four or five thousand years ago but may be colored in small part by contemporary sociopolitical concerns. Yet the modern Egyptian government has been a leader in the terribly difficult, indeed Herculean, contemporary efforts to transcend the ages-old rivalry between Egypt and Israel as evidenced for example by the 1979 peace treaty for which Egyptian president Anwar Sadat shared the Nobel Peace Prize. If in some sense, therefore, there is a subliminal struggle going on among the various currently powerful ethnonationalist and subnationalist groups in Egypt today regarding claims of the origin of the civilization that built the pyramids, then it seems that the emerging answer should serve not to inflame but to defuse the situation—because the answer is that the origins stem not from any of these groups but from Black Africans. Certainly it was the Black Africans of Egypt who, over the subsequent ages, melded with a number of other colors and ethnicities and thus essentially are today the same people of Egypt who should be extremely proud of the ancient accomplishments of their heritage.

CONSOLIDATING THE EVIDENCE

Other than the visual evidence of prehistoric rock art at Uwainat and Gilf Kebir, we will also see here and in chapter 6 that there is even more supporting evidence of a Black African origin in further analysis of the astronomical alignments at Nabta Playa and other prehistoric sites in the Egyptian Sahara. Meanwhile, in 2002, three decades after Nabta Playa was discovered, anthropologists Fred Wendorf and Romuald Schild published their overall views in the *Journal of the Polish Academy of Science* [*Archaeologia Polona*] affirming that

> [t]he tumuli, calendar, stele alignments and megalithic constructions, all concentrated around western shores of the then already dried ancient Lake Nabta, indicate that this area was an important ceremonial centre in the late and final Neolithic. The complexity of the arrangements, and enormous amount of closely managed work put into the construction of the megalithic constructions, indicate that the cattle herders of the South Western Desert created an early complex society with the presence of a religious and/or political control over human resources for an extended period of time. Common contacts of the Desert Dwellers with the Nile Valley inhabitants are indicated by frequent presence of raw material and ceramics originating in the Nile Valley. These contacts of cattle pastoralists with Predynastic, agricultural groups in the Nile Valley may have played an important role in the emergence of a complex, stratified society in the Great River Valley. . . . Physical anthropology of rare skeletal remains found in the late early, middle and late Neolithic suggests racial association of the populations with Sub-Saharan or black groups . . .[44]

Other eminent anthropologists were more categorical. In *National Geographic News* of July 2006, this article appeared:

> The pharaohs of ancient Egypt owed their existence to prehistoric climate changes in the eastern Sahara, according to an exhaustive study of archaeological data that bolsters this theory.
>
> Starting at about 8500 B.C., researchers say, broad swaths of what are now Egypt, Chad, Libya and Sudan experience a "sudden onset of humid conditions." . . . During this time the prehistoric people of the eastern Sahara followed the rains to keep pace with the most hospitable ecosystems.
>
> But around 5300 B.C. this climate-driven environmental abundance started to decline, and most humans began leaving the increasingly arid region.
>
> "Around 5,500 to 6,000 years ago the Egyptian Sahara became so dry that nobody could survive there." Said Stefan Kröpelin, a geoarchaeologist at the University of Cologne in Germany and study co-author. . . .
>
> Among their findings, the researchers provide further evidence that the human exodus from the desert about 5,000 years ago is what laid the foundation for the first pharaoh's rule . . .
>
> David Phillipson, a professor of African archaeology, directs the Museum of Archaeology and Anthropology at the University of Cambridge in England . . .
>
> "As the Sahara dried and became less suited and eventually unsuited to habitation, people ultimately had to move out, whether it be southward or to the east into the Nile Valley," Phillipson said.
>
> "And this [study] helps [us] to understand the apparent rather sudden development of intensive settlement by

sophisticated societies in the Nile Valley 'round about five or six thousand years ago."[45]

Michal Kobusiewicz and Romuald Schild are both renowned anthropologists who have studied Nabta Playa under the aegis of the Institute of Archaeology and Ethnology of the Polish Academy of Sciences. After pointing out that the ancient Egyptian pharaonic state was formed around 3300 BCE, they commented that "we already know that soon after this date, drought forced the [Nabta Playa] herdsmen to abandon their lands . . . and so where might they have gone, if not to the relatively close Nile Valley? They brought with them the various achievements of their culture and their belief system. Perhaps it was indeed these people who provided the crucial stimulus towards the emergence of state organization in ancient Egypt."[46]

Schild and Kubusiewicz also call "these people" prehistoric herdsmen, prehistoric pastoralists, Neolithic cattle herders, and sub-Saharans. The term *Black,* however, is clearly avoided. As we have seen, the ancient sub-Saharan people were of the pre-Tebu Black race whose ancestors inhabited the Tibesti and Ennedi Mountains of northern Chad—but who really were the Tebu? How did they look? In the 1860s, the German explorer Gerhard Rohlfs was among the first Europeans who had made contact with the elusive Tebu people.

> Their stature is svelte, their members fine, their disposition light and swift; they have lively eyes, their lips are a bit tough, their nose is small but not snubbed, and their hair is short but less wiry than the Negroes. . . . All other travelers who made contact with the Tebu have noted that their physical traits tend more towards the Negro . . . their customs and traditions are also nearer to that of the Negro . . . the land of the present day Tebu is located south of Fazan, in the north of Lake Chad . . .[47]

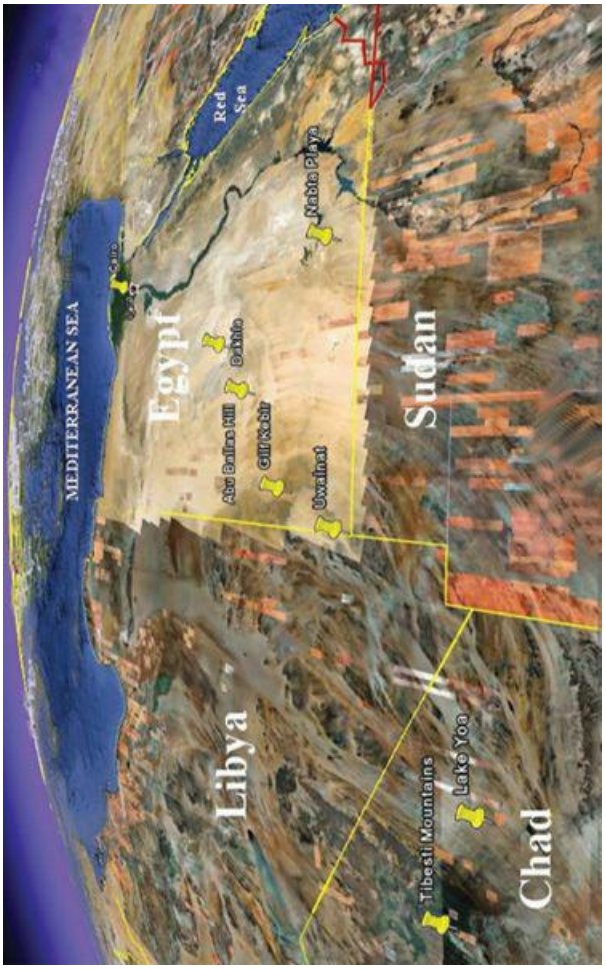

Plate 1. Satellite map of the Egyptian Sahara (produced in part using Google Earth)

Plate 2. Djedefre Water Mountain, central cartouche, east face

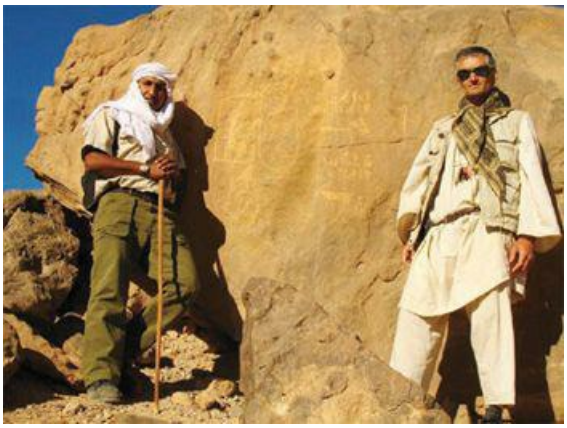

Plate 3. Mahmoud Marai (left) and Mark Borda with the newly discovered Uwainat Inscriptions, November 2007

Plate 4. Two views of the megaliths that were arranged on top of CSA before CSA was excavated. These appear to be shaped as if fitted together or symbolic of connection. Images taken October 2003. As of April 2008, one of these megaliths was removed, possibly to the Nubian Museum.

Plate 5. A human figure emerging from the head of a large animal, possibly a lion, in the midst of a group dance. This appeared to us to be reminiscent of modern shamanic imagery (in which a shaman enters the mind of a powerful animal as part of a ritual). Lower left, a large orb, possibly the sun or moon, with a single hand. Mester Kawai-Foggini cave, southwest Gilf Kebir.

Plate 6. Domestic scene with cattle at the Uwainat cave

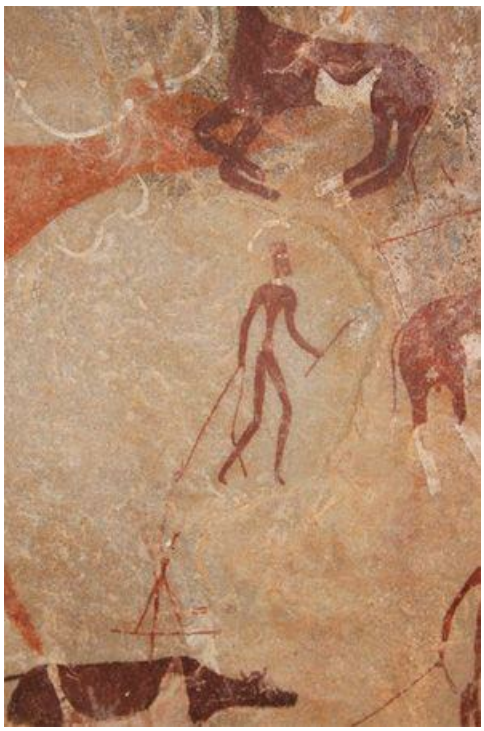

Plate 7. Human with cattle on a leash, Uwainat cave

Plate 8. Robert Bauval with herder near Assiut

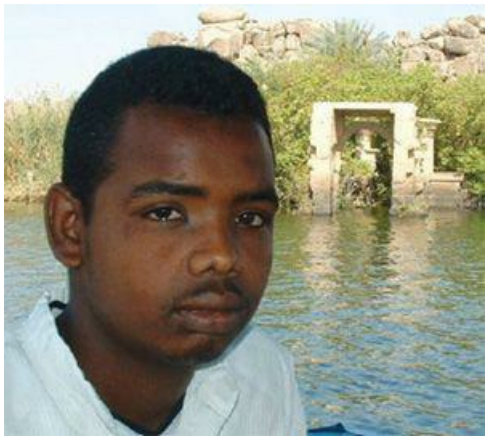

Plate 9. Nubian boatman at Aswan. Behind the boatman can be seen the Island of Bigeh, near Philae, and the remains of the entrance of a doorway built by Augustus that led up a stairway to a temple, the pronaos, built by Ptolemy XII.

Plate 10. Elder at Siwa Oasis

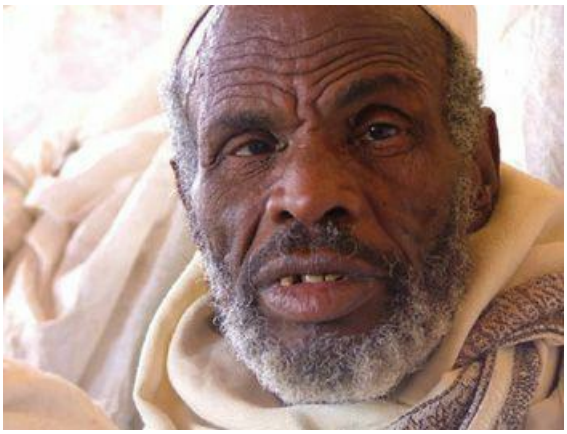

Plate 11. Elder at Siwa Oasis

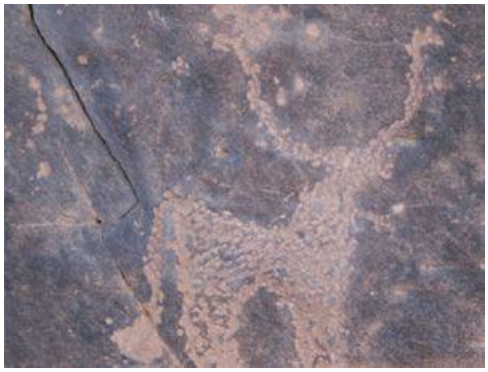

Plate 12. Prehistoric carving of cattle ca. 8000–6000 BCE, Gilf Kebir

Plate 13. Prehistoric carving of cattle ca. 8000–6000 BCE, Karkur Talh, Uwainat. Note how the cow is ornate with body harness or perhaps a blanket.

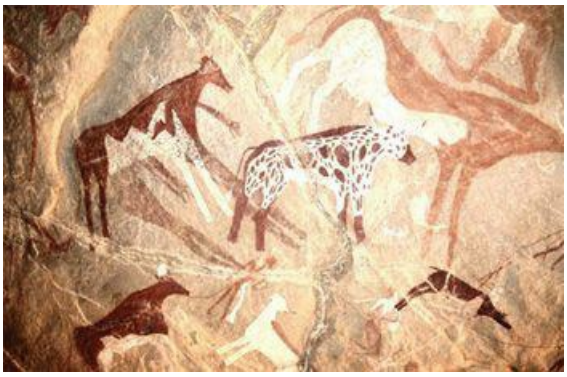

Plate 14. Cattle, Borda Cave, northern Uwainat, ca. 6000–4000 BCE. Note spotted cow.

Plate 15. Models of cows, Eleventh Dynasty, ca. 2000 BCE. Courtesy of the Cairo Museum.

Plate 16. Cow goddess Mehet-Weret (“Great Flood”) representing the yearly inundation of the Nile, ca. 1500 BCE. This goddess is sometimes linked to Isis.

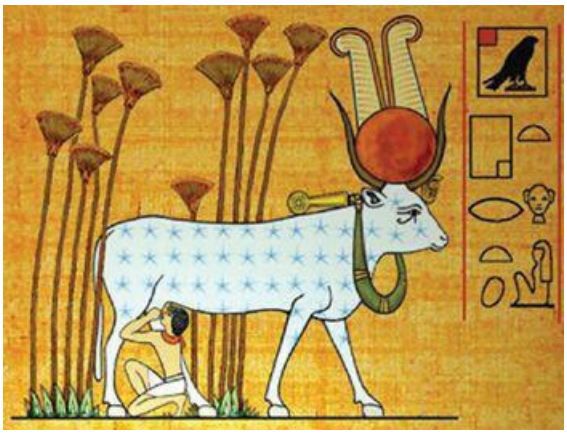

Plate 17. The cow godess Hathor, New Kindom, ca. 1500 BCE. Note the stars on her body. Hathor’s cult is attested from earliest times.

Plate 18. The goddess Isis with cow horns, suckling the child Horus

Plate 19. The Step Pyramid at Saqqara

Plate 20. The head of the Sphinx. Note “Negroid” features.

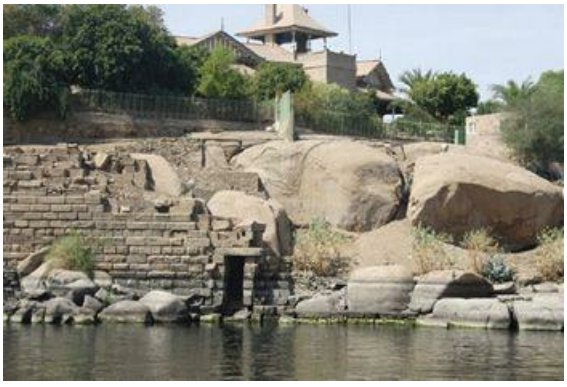

Plate 21. The Nilometer on Elephantine Island at Aswan

Plate 22. The rock-cut tomb of Harkhuf at Aswan (west bank)

Plate 23. A hunting scene found in the Kifah cave. Photo courtesy of Mark Borda.

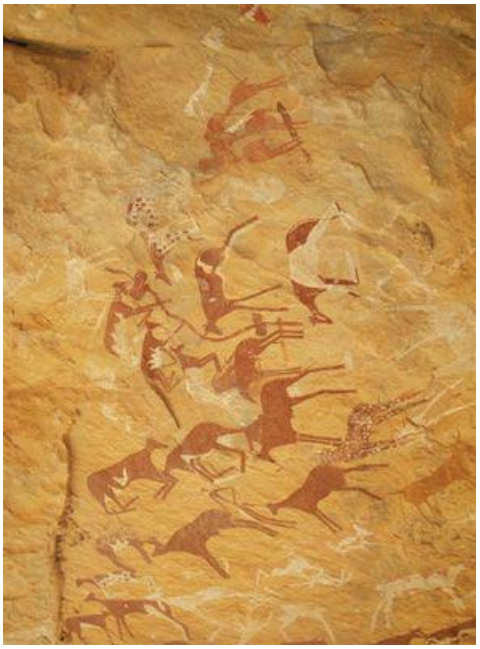

Plate 24. Rock painting of cattle, goats, and other animals found in the Kifah cave. Photo courtesy of Mark Borda

Plate 25. The temple of Hathor at Dendera

When Rosita Forbes traveled to the oasis of Kufra with Ahmed Hassanein in 1921, she became the first European woman to encounter the Tebu—some two hundred of them still living in the Kufra region. Sir Harry Hamilton Johnston, the great British explorer and diplomat who wrote the introduction to Forbes's book, comments on that region and the Tebu people.

> It is one of the vestiges of a formerly well-watered country ten, twenty or more thousand years ago. To it [Kufra] came, long ago, when the intervening desert was much more traversable, clans of Tu, Tebu or Tibu people, nowadays the dominant population of Fazan and Tibesti. . . . They are seemingly of considerable antiquity, the Garamantes of Herodotus and the Romans, the Tedamansii of Claudius Ptolemeaus, the Alexandrian geographer of the second century. They represent one of the numerous races between the White man and the Negro, but in their purer and more northern extension they are a people with a preponderance of White man stock. The skin is dark-tinted and the hair has a kink, a curl about it. . . . They do not differ very much, facially, from the Hamitic people of Northeast Africa . . .[48]

It was a small contingency of Tebu people that Ahmed Hassanein had in fact encountered at Jebel Uwainat in 1923 (see chapter 2). He called them Goran, which is another name for these ancient people. There were one hundred fifty of them, ruled by a king called Herri. In Hassanein's words, here is what happened when he woke up one morning in Wadi Karkur Talh at Uwainat:

> As I opened my eyes a figure stood near me that seemed to be part of a pleasant dream. She was a beautiful girl of the Goran, the slim graceful lines of whose body were not spoiled by the primitive garments she wore. She carried a bowl of milk, which she offered with shy dignity. I could only accept it and drink gratefully. . . . A Tebu appeared with a parcel of meat of the *waddan* or wild sheep. I gave him macaroni and rice and he went away happy. After we had eaten I went to see some relics of the presence of men in earlier times. . . . I had got talking with one of the Gorans, and having satisfied myself about the present inhabitants of Ouenat, I asked him whether he knew anything about any former inhabitants of the oasis. He gave me a startling answer. "Many different people have lived round these wells, as far back as anyone can remember. Even *djinns* have dwelt in that place in olden days." "Djinns!" I exclaimed. "How do you know that?" "Have they not left their drawings on the rocks?" he answered. With suppressed excitement I asked him where. He replied that in the valley of Ouenat there were many drawings upon the rocks, but I could not induce him to describe them further than saying that there were "writings and drawings of all the animals living and nobody knows what sort of pens they used, for they wrote very deeply on the stones and Time has not been able to efface the writings." Doing my best not to show anything like excitement, I inquired whether he could tell me just where the drawings were. . . . I gathered that Ouenat was the *pied-a-terre* of Tebus and Goran. . . . With these drawings in mind, then, I took Malkenni who had joined the caravan at Arkenu, and towards sunset he led me straight to them. They were in the valley at the part where it drew in, curving slightly with a suggestion of the

wagging tail. We found them on the rock at the ground level. I was told there were other similar inscriptions at half a day's journey, but as it was growing late and I did not want to excite suspicion, I did not go to them. There was nothing beyond the drawings of animals, no inscriptions. It seemed to me as though they were drawn by somebody who was trying to compose a scene. . . . On their wall of rock these pictures were rudely, but not unskillfully carved. There were lions, giraffes and ostriches, all kinds of gazelle, and perhaps cows, though many of these figures were effaced by time . . . I asked who made the pictures, and the only answer I got came from Malkenni, the Tebu, who declared his belief that they were the work of the *djinn*.[49]

Djinns and the Rock Art at Jebel Uwainat

In chapter 2 we saw that Hassanein went on to speculate that the reason Malkenni and the Tebu thought the rock art was created by djinns was because it depicted giraffes and other animals that had not been in the area for thousands of years. We also saw that if the rock art scenes are taken as literal representations, some show strange activities, such as a human floating in thin air near the head of a giraffe. In one cave at Gilf Kebir, there are numerous images of a human form merging with or morphing out of animals—which is so reminiscent of modern shamanic ceremonialism that we started calling it the Cave of the Shamans. This, then, might be another reason why Malkenni and the modern Tebu attributed the rock art to djinns.

By 1932, however, the Tebu/Goran of Uwainat had completely disappeared. Thus, when Ralph Bagnold and his colleagues organized an expedition to Uwainat in 1938, under the sponsorship of the Egypt Exploration Society, they found only scant remains of these people at Karkur Talh: "Tibu [Goran] remains: In Karkur Talh many traces were found of the Guraan who formerly used to visit the wadi. Most of these were probably left by the band of fugitives who fled here after the French occupation of the Ennedi-Tibesti Highlands . . . there was no evidence that the Tibu had been in the region for a number of years."[50]

In addition, when Count Almasy was at Gilf Kebir and Uwainat in 1936, he took a Tebu man, Ibrahim, as his guide. Ibrahim recounted how a certain Tebu chief called Abdel Malik had been given permission by the Senussi of Kufra to graze his camels in the region. Abdel Malik discovered a lush valley at Gilf Kebir where he could graze his camels. He then left a written testimony that mentioned the origins of the Tebu people: "I, Abdel Malek, have the following to say concerning the valley I discovered: the Kufra oasis did not always belong to the Arabs. From time immemorial it was the land of the Tebu who owned all the places in the desert for ages. . . ."[51]

Ibrahim then told Almasy: "We, the Tebu, [are] the original inhabitants of this desert . . ."[52]

OUT OF THE SAHARA AND INTO THE NILE VALLEY

For many years a team of anthropologists headed by Rudolph Kuper and Stefan Kröpelin of Cologne University in Germany have been studying prehistoric sites and climatic changes in the Egyptian Sahara and the sub-Sahara in Chad, Sudan, and Libya. After analyzing radiocarbon samples from hundreds of prehistoric archaeological sites, they concluded that the climatic changes correlated with the movement of prehistoric people during the past twelve thousand years. The evidence also showed that there was a stable humid period from 8500 BCE to 5300 BCE, after which the people and their cattle—the same cattle people of Nabta Playa, Gilf Kebir, and Jebel Uwainat?—escaped the drying of the Sahara and spread pastoralism throughout the continent, and, perhaps, add Kuper and Kröpelin, "helped trigger the emergence of pharaonic civilization along the Nile."[53] This view is today shared by many anthropologists, including climatologists such as Professor Peter B. deMenorcal of Columbia University, who affirmed that "however fast the drying occurred, it pushed people out of north-central Africa, and that climatically forced migration might have led to the rise of the Pharaohs and Egyptian civilization."[54]

The speed at which the Sahara changed from a lush green savanna to the barren, arid, waterless desert that it is today has been a bone of contention among climatologists for many decades. In the early years geoclimatologists were generally gradualists—that is, against the idea of any rapid changes. More recent measuring methods, however, have indicated very

swift changes in some locations of the Sahara. Then, in 2005–2006, Kuper and Kröpelin studied deep core samples from Lake Yoa, in the Tibesti-Ennedi region of northeastern Chad, and found evidence there for a slow desertification that occurred over several millennia from about 10,000 BCE to 3500 BCE. It seems, then, that there was a combination of very rapid change in some areas and more gradual regional change as the monsoon pattern moved and continuously reshaped itself. In any case, it seems the drying process eventually drove the prehistoric people out of the Sahara—meanwhile giving them ample time across many generations to develop animal domestication; basic agriculture; art; primitive sign writing; the knowledge of how to move large stones and construct complex megalithic structures; and knowledge of the simple principles of navigation, orientation, and timekeeping with the sun and stars. In other words, they acquired the practical and intellectual tools for building a civilization by the time they migrated into the Egyptian Nile Valley around 3500 BCE.

Let us now take a closer look at Lake Yoa near the Tibesti-Ennedi highlands. This region warrants a closer investigation, for it lies in the extended direction of Bergmann's Abu Ballas Trail, which has as its starting point Dakhla oasis and passes through the Gilf Kebir and Jebel Uwainat massifs.

THE SOURCE?

Lake Yoa is among the largest of a series of small lakes in the Ennedi that are located just 100 kilometers (62 miles) from the Tibesti highlands. All of these lakes total some 20 square kilometers (12 square miles) of surface water and were once part of a giant lake during the humid periods of the Sahara, between 13,000 BCE and 3500 BCE. These lakes have a natural hydrological system that is unique in the world: because they are constantly fed with fresh water from underground aquifers and are also protected by a natural matting of reeds that reduces the evaporation effect, their water stays fresh in spite of the extreme heat and superaridity of the region that normally would lead to high evaporation and, consequently, high water salinity. In addition, the water from the higher lakes perpetually filters through the surrounding sand dunes and into the lower lakes, thus replenishing them with fresh water. Such conditions are ideal for human settlement in an otherwise inhospitable environment. As we have already seen, these lakes lie in the extended direction of the Abu Ballas Trail that runs southwest of Uwainat. The Tibesti-Ennedi region where these lakes are located is full of prehistoric rock art that resembles that of Uwainat, and there are also prehistoric tumuli or tombs that recall those of Nabta Playa. It seems almost certain, therefore, that the sub-Saharan people of the Tibesti-Ennedi highlands migrated north into the Sahara, perhaps during more humid phases, when the desert was green and fertile, which explains the sixty-seven human skeletons found at Gebel Ramlah, near Nabta Playa, in 2002 by Schild and Wendorf. These remains were declared to be those of a Black sub-Saharan people.

MEET THE ANCESTORS

In the autumn of 2000, a team of paleontologists led by Dr. Paul Sereno of the University of Chicago were exploring the western part of the Tenere Desert when they made a startling discovery at a place called Gobero, near the old Tuareg caravan village of Agadez. Here, partly buried in the sand, were dozens of human skeletons amid a proliferation of stone tools and potsherds. Many of the skeletons were in a fetal position, with legs tightly pulled up against their chests and hands tucked close to their chins. Near the human skeletons were animal bones, including those of antelope, giraffe, and hippopotamus. According to Sereno, "Everywhere you turned, there were bones belonging to animals that don't live in the desert. . . . I realized we were in the Green Sahara."[55]

As we saw in chapter 3, for the past couple of hundred thousand years or so the Sahara has fluctuated between wet and dry phases caused by cyclical changes in Earth's motion, including the precession of the equinoxes, combined with other cyclical geologic processes. The most recent wet phase began after about 10,500 BCE, when the seasonal monsoons of central Africa again migrated north, bringing rain and fertility to a broad strip of land in the southern part of the Sahara running from the Nile in Egypt to the Atlantic coastline of Morocco. This wet phase brought into the Sahara fauna and people from the south, where, at first, they survived as hunter-gatherers, but then, with the change in climate, converted into pastoralists. In 2006, to find out more about what happened to these ancient people, Sereno teamed with the Italian archaeologist Elena Garcea of the University of Cassino, and together they re-examined the prehistoric skeletons of Gobero.

Garcea was very impressed by the large number of skeletons, which far outnumbered all others she had seen in the Sahara. She also directed her attention to the potsherds that were all around the skeletons and was quick to recognize on some of them the tiny dot marks that were typical of the Tenerian prehistoric herders that roamed the Sahara from 4000

BCE to 2500 BCE. What she found odd, though, was the pottery with wavy lines that Garcea attributed to the Kiffian, a fishing people who had lived in this same region thousands of years before the Tenerian, roughly from 6000 BCE to 4500 BCE. Garcea was baffled as to how the Kiffian and Tenerian peoples, whose presence here was separated by five hundred or more years, had used the same burial grounds. Garcea and Sereno also explored a dry lake nearby and found fishing hooks and harpoons made of bone and the remains of large Nile perch, crocodiles, and hippopotamus—all evidence of the Kiffian fishing people's presence in this area. Yet what could have induced the Tenerian, centuries later, to bury their own people in the cemetery of the Kiffian? According to Garcea, ". . . perhaps the Tenerian found the Kiffian burials and recognized this place as sacred. It's possible they thought these bones belonged to their own ancestors."[56]

There were more than two hundred burials at Gobero, and only carbon dating could determine their true age. Garcea and Sereno had to act quickly, because the site was unprotected and open to looting by Tuareg nomads who were in search of artifacts to sell to tourists. Many prehistoric sites in Niger have been looted before they could be studied and excavated by archaeologists, and Sereno wanted to avoid this calamity at Gobero. He finally managed to ship bone samples to his laboratory in the United States and have them dated by radiocarbon analysis. The results showed that some bones were nine thousand years old, falling in the Kiffian epoch, while others were six thousand years old, falling within the Tenerian epoch.

A biochemist from Arizona State University, Chris Stojanowski, also went to Gobero to examine the prehistoric site, and his own study of bones and other prehistoric artifacts showed that the Kiffian men had huge leg muscles, implying a high-protein diet, and the wear and tear of their bones showed that they had arduous lives consistent with the theory that they were hunter-gatherers and efficient fishermen. The Tenerian, on the other hand, had slender legs, and their bone structure showed that their lives were less strenuous than those of the Kiffian. This was consistent with the theory that they were herders and pastoralists. It seems that in the area there had been a hunter-gatherer phase as well as a later pastoralist phase, the former when the Sahara was very humid and rich with fauna, and the latter when the climate became drier and the fish and fauna became scarce, forcing the Kiffians to domesticate the wild cattle so that they could move their food supply to watering holes and fresh grazing grounds.

Of the hundreds of animal bones found at Gobero, none belonged to sheep or goats. They were the remains only of cattle. Yet the cattle bones were few, because the herders rarely slaughtered their cattle but rather kept them for milk and blood. In other words, the cattle were living protein larders. As far as we know, no DNA tests have been performed to determine the origins of the Kiffian or the Tenerian, although, apparently, scientists in the United States are working on this. In 2007 there was trouble in Niger from antigovernment insurgents, and the authorities imposed emergency rules that prohibited foreigners from traveling into the Tenere Desert. Sereno and Garcea were obliged to abort their planned 2008 season at Gobero. As things stand now, this unique prehistoric graveyard may soon be lost forever.[57]

TWO GIANT GIRAFFES IN STONE

Another fact regarding the prehistoric people of Gobero attracted our attention. Many of the stone tools that were examined by Sereno and his team had come from the mysterious region known as the Aïr Mountains, located some 100 kilometers (62 miles) to the north of Gobero. A few years earlier, at the foot of the Aïr Mountains near a place called Dabous, there was discovered an abundance of prehistoric art, notably two life-size giraffes that were exquisitely carved on a flat outcrop of sandstone. These engravings, according to the experts, probably belonged to the Kiffian and are tentatively dated to about 8000 BCE. The Dabous site contains more than eight hundred engravings, 50 percent of which are cows or other large bovines, and the rest of which are giraffes, ostriches, lions, rhinoceros, and even camels. There are also some sixty human figures. The two huge giraffes, a male and smaller female, are engraved on an 80-meter-long by 60-meter-wide (262-feet-long by 197-feet-wide) sandstone outcrop. The male giraffe is nearly 6 meters (20 feet) tall and the female about 3.5 meters (12 feet) tall. Albeit on a much larger scale, they resemble the giraffes engraved at Jebel Uwainat and Gilf Kebir in the Egyptian Sahara. More intriguingly, both at Gobero and Uwainat/Gilf Kebir, next to the giraffes are carved human figures holding ropes attached to the mouths or heads of the animals—and this clearly shows a special connection between humans and giraffes, perhaps even an attempt at domestication.

It is unlikely to be a coincidence that such similar images are found at Gobero and at Uwainat. Could the Gobero people and the Uwainat/ Gilf Kebir people have a common ancestry or origin? Although the answer is still unclear, all the evidence points to the possibility that the Kiffian and Tenere of Niger, the Nabta Playa pastoralists, and the pre-cattle and cattle herders of Gilf Kebir and Uwainat all had a common ancestral source in the Tibesti-Ennedi region in Chad. The

evidence to date compels us to conclude that the original sub-Saharan Black race that first settled in the Chad highlands subsequently gave rise to the cattle people of the lower Sahara, who, in turn, spawned the great Egyptian civilization when they finally migrated into the Nile Valley as the Sahara became superarid. All the evidence seems to point to a northward spreading of a Black African people from the Chad highlands into the green Sahara during the humid period that started around 12,000 BCE. These people, it seemed, roamed the vast open spaces in search of water and grazing grounds as they gradually changed their habits from hunters to pastoralists. This conversion caused them also to change their appearance and traditions, and it contributed to them acquiring an increasingly complex knowledge of astronomy and navigation—which were all imposed on them by the changing climate and the gradual drying of the Sahara. Eventually, around 3500 BCE, they were forced to abandon the waterless desert and seek a new future in the Nile Valley. By then these very ancient Black people had equipped themselves with a wealth of skills and knowledge that included domestication of cattle, basic agriculture, art, and, more important, the ability to devise timekeeping systems and to determine orientations with the stars in order to navigate in the deep, open desert. All these skills led them to develop a complex social system and perhaps even basic religious ideologies, which were finally taken into the Nile Valley and injected, like some massive cultural blood transfusion, into the more primitive dwellers there, thus planting the seeds that sprouted and eventually bloomed into the pharaonic civilization.

Unfortunately, at present the Tibesti-Ennedi highlands are closed to foreign visitors due to political unrest in the region, but once they are accessible again, we hope to organize an expedition there. Yet the Egyptian part of the Sahara where we can find Gilf Kebir and Uwainat is still open to foreigners who acquire the necessary permits from the Egyptian authorities, and it is a very strong possibility that the people who left evidence there were the same as those who had constructed the ceremonial complex at Nabta Playa and, by extension, were the people who eventually migrated to the Nile Valley to kick-start the enlightened civilization of ancient Egypt.

DEEP DESERT JOURNEY

In December 2007 an old friend, Mark Borda (see chapter 2), contacted us while we were in Cairo. He lives on the island of Malta now and told us that he had recently been exploring the Egyptian Sahara with the services of an Egyptian, Mahmoud Marai. In 2006, Borda had been the main sponsor of Carlo Bergmann's camel expedition across the south of the Great Sand Sea in search of the Khufra Trail, which Bergmann believed linked the oases of Dakhla and Kufra in pharaonic times. For this expedition, Borda, together with other cosponsors, had hired Marai to provide vehicle backup. The next year, in November 2007, Borda again hired Marai for his own expedition to Uwainat. It was during this expedition that they had discovered irrefutable proof, in the form of hieroglyphic inscriptions, that the pharaohs had reached Uwainat in earliest times.

Mark sent us photographs by electronic mail, and we agreed that we would help him get a second translation from one of the Egyptology institutes in Cairo. Meanwhile Mark sought the help of British Egyptologists in London for another translation, reasoning that if both translations were the same, then he could be reasonably sure of the meaning of the hieroglyphs. He also put us in contact with Mahmoud Marai, who lived in Cairo.

We met Marai in January 2008 and immediately made plans for a deep-desert expedition to Gilf Kebir and Jebel Uwainat. Marai said he and his three Toyota Land Cruisers could be ready within a week. The problem, as usual, was raising the money to fund our expeditions, which, like other expeditions, could be a costly business. To defray some of the cost, we decided to invite a few paying guests in addition to putting up part of the money ourselves. By mid-March we had acquired all the funds necessary and fixed a date for the first week in April. The guests, who included Michele (Robert Bauval's wife), Bryan Hokum (a filmmaker from Los Angeles), Lyra Marble (who has a Pumpkin Patch[*41] business in Hollywood), and Dustin Donaldson (a performance artist who also manages a website devoted to esoteric philosopher Manly P. Hall). We arrived in Cairo on April 5, and two days later we met Marai and his crew at the Bahareya oasis, the starting station for our deep-desert journey. After being delayed two days by local police until our permits were ready, and until we could be allocated a military escort (who was an unarmed soldier named Muhammad), we finally were ready to set off. We spent the third night at the Farafra oasis, and then we headed toward Dakhla oasis. Just before reaching Dakhla, we turned southwest and off the tarmac road to head into the open desert.

There is nothing more thrilling than traveling toward the unknown. Ahead of us was emptiness as far as the eye could see, and the more we pushed southwest toward the horizon, the more this emptiness engulfed us, reducing us, it seemed, to the size of ants. It is during moments such as these that we become aware of how vastly unpopulated our planet still is. If we are concerned about world population, then we ought to take a trek in the desert, where the gods will

reassure us that all is not lost, after all.

We stopped for the night at Carlo Bergmann's Djedefre Water Mountain. It was too dark to explore it when we arrived, so we had to wait until dawn. As seen in chapters 2 and 4, we found solar solstice alignments, possibly prehistoric, and hieroglyphic evidence that added to our designation of the place as a sun temple revived from prehistoric times by expeditions under the reign of King Djedefre. After spending a few hours around sunrise inspecting the site and its surroundings, we again set off southwest for another 100 kilometers (62 miles), which, in these difficult off-road conditions, is the daily average distance that is reasonable to expect with heavily laden vehicles.

On the way we inspected more prehistoric rock art, particularly on a strange castle-shaped mound where there were engravings of African fauna such as giraffes and elephants. On one such engraving we identified a donkey, which reminded us that this was the only animal of burden available to desert travelers until the domesticated camel was introduced into Egypt in around 500 BCE. That evening we camped at the foot of a large dune. It's difficult to find the right words to describe a night in such a remote and untouched place—*serene, peaceful,* perhaps even *close to the gods.*

On the third day, after we traveled for several hours along the edge of the Great Sand Sea and its massive golden dunes, we arrived at the mysterious stone circle that British explorer Sergeant Ralph Bagnold of the Long Range Desert Patrol discovered by chance in 1930. It was hard to believe that this strange artifact was thousands of years old and that most of the heavily eroded standing stones had remained undisturbed for all this time. Yet this is what is most curious about this particular desert: explorers can find prehistoric stone artifacts simply lying in the sand, as if they had been placed there that same day. We examined Bagnold Circle and its possible astronomy and artifacts of the surrounding area (see chapter 4). We made camp for the night on a flat sandy area that was about 300 meters (985 feet) from the circle, which gave us a wonderful opportunity to check the alignments of the circle at sunset and at night with the stars. We also took measurements at sunrise.

The next day, we set off again, and after nearly a whole day's drive, we reached the edge of Gilf Kebir. The weather was scorching hot. We drove into a broad valley with a range of hills on both sides, and it was obvious that it had rained very recently, for the floor of the valley was covered with a fine duvet of green sprigs and a few wildflowers here and there. It was a beautiful sight, so unexpected in this desert world of stark yellow and brown hues. Marai, who had been at Gilf Kebir many times before, said that he had never seen vegetation here and would honestly not have believed it possible had he not seen it with his own eyes. According to weather statistics, it rains here only a few millimeters every twenty years or so.

We stopped the cars and stretched a tarpaulin between two of the vehicles to make a shaded area in order to have a light meal and sleep for a couple of hours, thereby avoiding the blistering heat of high noon. At last, when the sun was lower in the sky, we resumed our drive toward the so-called Aqaba Pass. We reached the pass a few hours before sunset and quickly drove through the massive gash that looks like a stone version of the parting of the Red Sea: It felt as if at any minute the high walls would come tumbling down upon us like giant waves. While navigating the soft desert floor of the pass, we had some anxious moments when two of our three vehicles bogged down, stuck at the same time. If we had not been able to free at least one of them, our survival would have become precarious, but we managed to get them out, and we emerged safely on the west side of Gilf Kebir and then drove northward, our vehicles skimming the edge of the huge rocky cliffs like tiny cockroaches. The landscape is best described as Martian, with strange outcrops of brown and reddish rock and weird sand formations, and we felt as if we were on a lifeless alien planet.

Just as the sun was setting low, we reached the celebrated Wadi Sura, the location of the famous Cave of Swimmers discovered by Almasy in 1936. It was growing dark, and Marai gave orders to his crew to set up camp and prepare the evening meal. Sitting around a campfire, sipping hot tea, we talked of the rock engravings and drawings in the cave. We had seen photographs and the drawings of Almasy that showed black-skinned people diving and swimming (hard to imagine now in this arid region), and others in the art appeared to be dancing, hunting, playing games, and even perhaps performing religious rituals. Dustin, one of the American guests, was celebrating his fortieth birthday, so we decided to give him a treat by organizing a little celebration at the entrance of the cave. The spectacle seemed to be in a fairytale setting, with the stars twinkling brightly over the peaks of the cliffs in front of the cave and our flashlights bringing to life the prehistoric drawings. For a little while we were all in an enchanted mood, as if time was standing still, as if we had perhaps been here before in some very distant time. It was amazing how well-preserved the drawings were, and we gazed at them for hours, entranced by the mood and the ancient art and talking to each other in whispers so as not to disturb the usual silence of this place. People had been here thousands of years ago, and now it was our turn to be here in this primordial world. As we watched the night slowly give way to day, a shooting star—a meteorite—streaked silently across the sky. We all knew in our hearts that we would never forget this starry night.

The next day at dawn we headed a few more kilometers north along the massif of Gilf Kebir to see a cave recently discovered by an Egyptian-Italian team in 2002, the Mestekawi-Foggini cave, named after its two discoverers. The cave was actually a deep ledge high up a rocky cliff that can be reached only by climbing up a steep sand dune that abuts the rocky cliff. It was very hot, and climbing up the dune took our breath away. We stood panting like marathon racers at the end of their run, but we forgot any physical discomfort as soon as we stood before hundreds of prehistoric drawings of men, women, cattle, and other fauna that filled the walls and ceiling of this large ledge. It was impossible to look at all of the drawings at once, so we each picked a spot where we could lie on our backs on the clean sand and admire the ancient art in segments. The Italian discoverer, Foggini, called this the Sistine Chapel of the Sahara, and no doubt a prehistoric Michelangelo must have been at work here.

The cattle, which comprised 90 percent of the drawings, were in all sizes and postures and were perfectly proportioned, running and being herded and milked by men and women. Clearly cattle were the dominant interest of these ancient people. Were cattle sacred to them? There were, too, many prints of human hands with the palms and fingers fully spread, clearly created in the same manner as those at other ancient rock art sites: by blowing (spray painting) with the mouth over a hand. Was this to ward off evil or danger, or was it some sign of complex rituals? The cave also contained scenes of groups of people who seemed to be involved in ritual and images of a human emerging from or morphing into a powerful wild animal. This was so reminiscent of modern shamanic animal-spirit ritual that we called this the Cave of the Shamans. In addition, there were images of a large orb, possibly a sun or moon—but our sun was approaching noontime, and the heat became overbearing. It was time to resume our journey to Uwainat, the final destination of our expedition.

We had to travel another 130 kilometers (81 miles) of open, flat desert to reach Uwainat. The sand, however, was quite compact and firm, so we could drive at a fairly high speed. On our way we made a brief stop to examine a World War II vehicle that had been abandoned by the Italian army, and we were amazed that there was almost no rust on the metal parts. Halfway to Uwainat, we stopped again, this time to avoid getting too close to a large overloaded truck that was smuggling illegal contraband from Libya to war-torn Darfur in Sudan. The smugglers simply waved at us, and, not knowing what to do, we waved back. Our single military escort, Muhammad, said, *"seebhom, homa nass ghalaba*" (they are poor people; leave them be). The border between Egypt and Sudan is totally unsupervised, and Muhammad told us that a constant flow of smugglers passed here totally unchecked. In fact, worn into the sand is a pair of truck tracks, which are followed by all the smugglers who angle across this corner of Egypt to Libya. Apparently it was all very harmless, and both governments simply choose to turn a blind eye to this travel. We were told, however, that visitors had to watch for rebels from the Sudanese Liberation Army (SLA), who have been known to kidnap tourists in this region for ransom. As it turned out, we did not see any SLA rebels throughout our journey, although we cannot be sure whether they had not seen us! Finally, late in the afternoon, we could see the mountains of Uwainat. We still had some 40 kilometers (25 miles) to cover, but everyone was tired, and because we did not want to drive in the dark, we opted to make camp at the foot of a small dune and leave for Uwainat early the next morning.

Figure 5.2. Image of dancers at the Mestekawi-Foggini cave, southwest Gilf Kebir

Figure 5.3. Numerous prehistoric hand signatures and, lower left, people depicted as if reflected in a natural crack in the rock. The lower central group is possibly a depiction of a ritual. Mestekawi-Foggini cave, southwest Gilf Kebir.

We woke at the crack of dawn and drove southward until we reached the edge of Uwainat. There, we stopped to visit yet another cave with rock art that was discovered by Mark Borda in 2007. The cave is on the northern edge of Uwainat, and its entrance is tucked behind a ridge, which makes it almost invisible unless you know exactly where to look (which might explain why it was not discovered before 2007). We were, in fact, the first modern visitors to enter this cave since its original inhabitants had abandoned it millennia ago. The cave was half filled with sand up to 1 meter (3 feet) below the ceiling, which actually worked best for us, because most of the rock art was on the ceiling, like a prehistoric Sistine Chapel. The sand allowed us to see the rock art at very close range.

The drawings were of a much better quality than those we saw at Gilf Kebir. Not only were the ancient scenes more elaborate and showed more detail, but the colors—blacks, browns, reds, yellows, and whites—were extremely vivid, as if they had been painted the day before (see plate 14). The cattle were clearly tame and domesticated, and some of them were even shown with halters and leashes or with decorations on their bodies. The men were depicted as tall, slim, and agile. They were black-skinned and wore white ivory bands on their arms and thighs. They also had loincloths resembling those worn later by ancient Egyptians. On some of their heads were ornate hats, and many carried sticks, spears, and bows. The women wore skirts, necklaces, armbands, and earrings. A striking aspect of the renderings of the people was their heads, which were depicted either as wearing masks or symbolically as animal forms (long, rectangular snout, bright eyes, and ears near the top of the head). These animal-form heads, possibly cowlike, might have been representative of the central role that cattle played in the lives of these people. Some of them bore a striking resemblance to the early depictions of the Egyptian god Seth, a god of the desert regions whom the ancient Egyptians associated mythologically with the origin of dynastic Egypt itself. The Sahara scholar and rock art expert Dr. Jean-Loic le Quellec of the French CNRS (Centre National de Recherches Scientifique) is of the opinion that the “cave of swimmers” is a prehistoric precursor and probable influence of rituals found in the much later pharaonic Coffin Texts and Book of the Dead. He thinks the “swimmers” are performing an afterlife journey into the watery afterworld, which he relates to the *mni.w* (the dead who had sunk into the other world) and which confront a mythical Beast, which he related to the ancient Egyptian beasts or monsters, *mmyt,* which swallow the dead in the so-called Judgement Scene of the Book of the Dead. According to Quellec the ancient Egyptians kept the memory of the origins in the Sahara and even may have periodically carried out pilgrimages to revisit their ancestral lands.

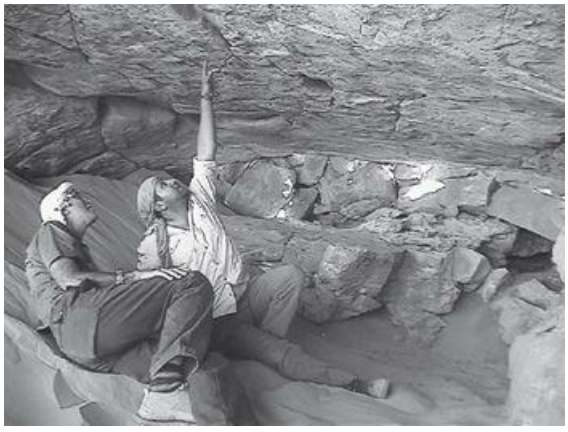

Figure 5.4. Bauval and Marai examine newly discovered cave art in April 2008. Note that the back wall of the cave appears to be constructed of megalithic blocks.

The memory of the ancient lands must have lasted for a long time, and was perhaps progressively mythified,

following a process that has been well documented in ethnology in many other places in Africa. Perhaps the rituals even demanded a periodic return to ancient cult places . . . like the great shelter of the Wadi Sura. In this way the memory of the ancient vision of the land of the dead, as well as the land of origins, would have been preserved.[58]

The recent finding of Bergmann and Borda fully support this hypothesis, and to which we also agree.

Central to the cave ceiling was a domestic scene, with bags or gourds probably filled with milk or grain, hanging from the roof of a house. There were three types of cows: black and white, all white, and white and brown with black spots. These were drawn in very realistic postures—walking, grazing, or being herded to a watering hole. We took photographs from every angle in order to have a detailed record for our own files. Oddly, outside the cave there were no visible signs of human presence as far as we could make out.[*42]

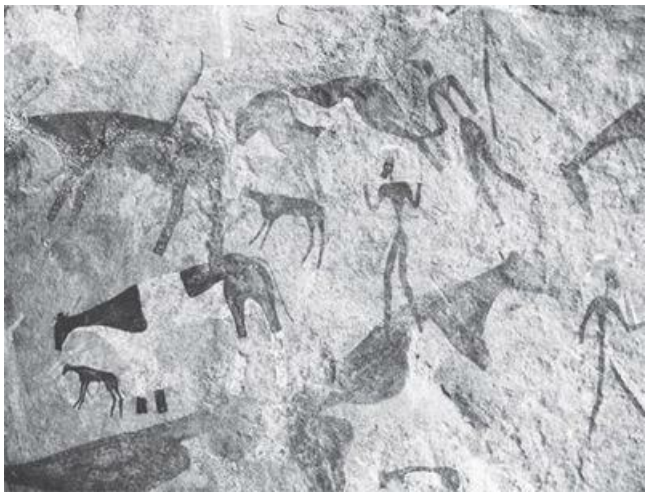

Figure 5.5. Cattle and people at Uwainat cave

It is likely that any such evidence lay buried under the sand that had filled the floor of the cave, drifting in and out over the millennia. Our imaginations ran wild: we conjured images of the hardy people who must have lived here thousands of years ago and who, perhaps, hailed originally from the Tibesti Mountains. The rock art they left behind made it easy for us to visualize their women milking cows or grinding seeds and cereals while their men went hunting or chipped stones to make knives and arrow or spear heads and the elderly sat outside at night, pondering the stars. The most thrilling part of this experience was finally to see with our own eyes those mysterious black-skinned ancestors that once navigated the desert, learned the art of husbandry, followed basic agriculture, practiced the rudiments of astronomy and timekeeping, and then finally moved eastward toward the Nile, toward Egypt, carrying their precious cargo: knowledge, which was to spawn a great civilization.

We resumed our journey, skirting the eastern flank of Uwainat Mountain, reaching the Sudanese border early in the afternoon. On our way south we steered clear of a small sign fixed on a metal pole (we examined the sign and saw that it said, in Arabic, misr [Egypt] on one side and sudan on the other, and our handheld GPS indicated it was a few kilometers off the actual border). Continuing south, we drove across the border and around the mountain and found ourselves on the south flank of Uwainat late in the afternoon. Here, the remoteness and utter mystery of this strange place took hold of us. The landscape was otherworldly, and we felt as though we were astronauts landing on an alien planet for the first time. It was very tempting to start exploring, but night was falling fast, so we decided to camp in a sandy bowl set against a rocky mound some 5 kilometers (3 miles) from the mountain.

We hardly slept that night; the excitement was too great. We refrained from lighting a fire in order not to attract SLA rebels that may have been roaming the region. Just a few weeks before, a group of foreign tourists had been kidnapped in this area, and our unarmed military escort was extremely nervous about being here on the Sudanese side of the border. In the morning, at the first break of light, we quickly lifted camp, packed our gear, and set off toward the massif of Uwainat. We headed for the twin peaks that dominated the ridge and toward the place where Marai and Borda had seen the pharaonic inscriptions a few months before. As we drove there, one of the drivers suddenly let out a shout. He had apparently spotted part of a human skeleton sticking out of the sand. We stopped and rushed to examine the shallow burial. It was not prehistoric but was much younger, probably less than a century old. Likely the skeleton belonged to a Tebu nomad or Bedouin. Our drivers could tell he was a Muslim from the way the body was laid. As Muslims

themselves, our drivers uttered a brief prayer and covered the exposed part of the skeleton with more sand.

We resumed our drive toward the twin peaks and parked the vehicles at the foot of a rocky slope. Then we all walked in silence, following Marai, still under the somber mood of seeing the lonely burial a few minutes before. After a trek of ten minutes or so, Marai stopped and pointed to a large boulder that rested precariously halfway up the rocky slope. We recognized the boulder from the photographs that Mark Borda had sent us in December. We quickly clambered up the slope, and finally, there they were: pharaonic inscriptions carved on the south face of the boulder.

After Marai and Borda, we were the first modern visitors actually to see them after some unknown ancient Egyptian scribe had crudely carved them thousands of years ago. It was a thrilling and rewarding feeling—perhaps a bit like Howard Carter must have felt when he discovered Tutankhamun's tomb. We knew from the translations that had been made by the Egyptologists in London that the inscriptions dated from about 2000 BCE and likely belonged to an envoy sent by King Mentuhotep II to rendezvous here with people from the kingdoms of Yam and Tekhebet. It was truly exciting to see with our own eyes this extremely ancient message carved thousands of years ago. It was rather like finding a message in a bottle in a vast ocean of sand. We felt privileged and, in a curious way, humbled. We knew the difficulty of such a trip from the Nile Valley, even in our well-equipped, four-wheel-drive vehicles, and we marveled at those unknown ancient Egyptians who had braved the journey on foot with their caravan of donkeys, traveling several months in such conditions.

They must have stayed here for some time, because, lower down the slope, we could see some stone rings that might be the leftover rims of habitations. How many ancient Egyptians had come here? Did the intrepid Harkhuf also come here? Who were the mysterious people from Yam and Tekhebet that they had met here, and from where had they come? Had they come from the Tibesti-Ennedi highlands of Chad some 700 hundred kilometers (435 miles) farther to the southwest? More important: Did the ancient Egyptians know that they were meeting their own ancestors?

Figure 5.6. The April 2008 expedition team anticipating the first showers in eight days upon seeing the tarmac road again. Left to right: Robert Bauval, Dustin Donaldson, Michele Bauval, Mahmoud Marai, Bryan Hokum, Lyra Marble, Thomas Brophy, and soldier Muhammad. Drivers Muhammad and Aziz are taking the photo.

All these questions formed a tantalizing web of hints and clues in our minds, but we knew it was time to return to the Nile Valley to look more closely at the place where Egyptologists say the ancient Egyptian civilization supposedly began.

6

THE CATTLE AND THE STAR GODDESSES

About the time the rains were falling off in the desert, the people in the Nile Valley suddenly started taking an interest in cows, building things with big stones, and getting interested in star worship and solar observatories. . . .

FRED WENDORF, *THE NEW SCIENTIST,* JULY 28, 2000

The . . . risings of Sirius had been observed on Elephantine throughout all periods of ancient Egyptian history.

RONALD A. WELLS, *SOTHIS AND THE SATET TEMPLE ON ELEPHANTINE*

The Egyptians . . . were the first to discover the solar year, and to portion out its course into twelve parts. They obtained this knowledge from the stars.

HERODOTUS, *THE HISTORIES, BOOK II*

TAMING THE AUROCH

In our modern world we take much for granted. One is the common domestic cow—one of the most gentle, most accommodating, and most useful animals on our planet. When we drive along a country road or walk past an open field and see these gentle and docile animals grazing or lazily walking about, we may give them a fleeting glance, but we soon forget about them. To ancient people, however, cattle were the main display of prosperity. The pharaohs of Egypt, for example, not only measured their wealth by the number of cattle they possessed but also were themselves, as were many of their gods and goddesses, identified with cattle. Yet if cattle were of great importance to the ancient Egyptians, they were of crucial importance to the prehistoric people of the Sahara. Their very survival depended on cattle. Without cattle they simply could not have existed in the harsh conditions in which they lived. Indeed, it would not be an exaggeration to say that without cattle there would have been no civilization, at least in the way we understand the word *civilization* today.

When and from where, however, did cattle come, and what did humans do before cattle were domesticated?

Scientists agree that the now extinct auroch, or *Bos primigenius,* is the ancestor of domesticated cattle. The auroch, however, was a much larger and certainly a much more ferocious creature than our common farm cow. Its height was more than 2 meters (7 feet), and it weighed as much as 2 tons. The male auroch was black with faint stripes, and the female was reddish brown. It is probable that the ancestor of the auroch itself existed in Africa some one million years ago and eventually spread to Asia and Europe around two hundred fifty thousand years ago. At first, and for many thousand of years that followed, the auroch was hunted for food by prehistoric man—a feat that must have been quite terrifying and very dangerous indeed, requiring many able hunters who could work together to bring down such a wild and powerful beast. Then, around 8000 BCE, the auroch was finally domesticated, although we don't fully understand where and how. Only a few years ago scientists thought domestication of cattle had originally taken place in Turkey or southwest Asia and that, somewhere along the line, the domesticated breed spread into other parts of the world. Recent research in the mitochondrial DNA of cattle stock from Africa, Asia, and Europe, however, strongly suggests that there was not one domestication event, but several, which occurred independently in each continent in roughly the same epoch.

Normally, domestication of cattle and other animals follows the establishment of agriculture, but there are exceptions. In Africa, for example, domestication took place before agriculture or even without agriculture. The Masai of eastern Africa are well-known herders who do not practice agriculture, yet their lives are completely interwoven with cattle: their protein intake—milk, blood, and sometimes meat—is almost totally derived from their cattle. The Masai very

rarely kill their cattle for food except on rare occasions, such as important feasts or celebrations. The evidence from Nabta Playa strongly suggests that the prehistoric people there treated their cattle in very much the same way. Furthermore, carbon-14 and other dating methods used by Fred Wendorf indicated that the cattle there were domesticated some ninety-five hundred years ago, making Nabta Playa the earliest known domestication center in the world. In view of this startling conclusion, let us take a closer look at the mysterious cattle people of Nabta Playa, for clearly they were far more sophisticated and resourceful than we previously thought.

BONES AND STONES

We can recall that at Nabta Playa, Fred Wendorf and his team discovered a dozen tumuli on the west side of the site, which contained dismantled bones of cattle and, in one particular case, the complete, articulated skeleton of a young cow. The heads of the cows were all directed south, implying a religious ritual. In addition, when they excavated the largest of the so-called complex structures, CSA was found to contain a huge boulder fashioned in the rough shape of a cow, the so-called cow stone. This stone was removed from its original burial place by anthropologists with a makeshift derrick and was taken to the city of Aswan, where it was placed in the yard of the Nubian Museum.[*43]

We also have seen that it was from the cow stone tumuli and CSA that long lines of upright stones emanated like spokes from a bicycle wheel toward the north and the east—with the former lines directed toward the Big Dipper and the latter lines toward Sirius and Orion's belt. It should come as no surprise, therefore, to know that much later these three stellar asterisms were also targeted by ancient Egyptians and were even given intense cow and bull symbolism. Indeed, according to most Egyptologists and archaeoastronomers, it is only these three stellar asterisms that can be identified with any certainty from ancient Egyptian texts and drawings.[1] The pharaohs knew the Big Dipper as Mesekhtyw, the thigh (of a bull or cow), and Sirius as Spdt, which was linked to the well-known cow goddesses Hathor and Isis.[†44]

Orion was known as Sah, and this constellation was associated with Osiris and the pharaoh who, in turn, was also symbolized as a celestial bull and the celebrated Apis Bull of Memphis. Further, all of these clues involving cattle and megalithic astronomy specifically involving Sirius, Orion, and the Big Dipper strongly suggest a link across the centuries of religious ideologies between the prehistoric society of the Sahara and that of pharaonic Egypt. We will return to this and other links between the mysterious cattle/star rituals of Nabta Playa and the various stellar/ cow goddesses and gods of pharaonic Egypt, but first we must understand why the ancients associated their cattle with the rising of these stars[2] and why this association was so important to the prehistoric black people of Nabta Playa.

NAVIGATING THE SAND SEA

As we saw in chapter 2, when Ahmed Hassanein trekked at night to reach Uwainat, his Tebu guide used the stars to navigate in the featureless desert landscape, very much as some do on the open sea. When we travel in open desert conditions without a compass or GPS, especially at night, it is extremely easy to become confused and lost, with no way of telling direction. In the daytime, traveling is very different: the sun's shadow can be used to establish the cardinal direction at noon—but at night, and especially on a moonless night, only the stars can perform this role. As an example, we recall that on such a moonless night during our journey, we did not light any fires or lamps at our campsite in order not to advertise our position to SLA rebels or brigands. In such darkness it was nearly impossible for our campsite to be seen beyond a hundred meters (328 feet) or so. The only way to mark its position, therefore, was to use the stars as the Bedouins did. In such open, barren spaces, in fact, it soon becomes second nature to use the stars for navigating at night. Almost certainly the ancient cattle herders of the Sahara did the same. Indeed, these ancient people had all the time in the world to study the night sky, because they were there in the desert, night after night, from generation to generation, from century to century, perhaps even from millennium to millennium. They could become fully familiar with all the observable star cycles, including precession. It is also probable that when they finally became sedentary and settled permanently at Nabta Playa, the need for navigation became obsolete, and thus their practical knowledge of the stars was converted into a star religion with rituals and symbolic structures that, in their minds, allowed them to communicate with the sky gods. The same star religion, but in a much more elaborate form, was later practiced by the ancient Egyptians, or, as we now are beginning to suspect, was inherited from the star cattle people of the Sahara and was further developed.

The immense importance of the stars, especially Sirius, to the ancient Egyptians is recognized by all Egyptologists. Sirius, as is well-known, marked New Year's Day and also served as a cosmic herald of the Nile's annual flood. More important, Sirius was directly associated with the rebirth of kings. Dr. Jaromir Malek, director of the Griffith Institute at

Oxford, writes, "The Nile and its annual flooding were dominant factors in the newly formed Egyptian state";[3] and Dr. Richard Wilkinson, Egyptologist at the University of Arizona, adds that the great importance of Sirius to the ancient Egyptians "lay in the fact that the star's annual appearance on the eastern horizon at dawn heralded the approximate beginning of the Nile's annual inundation."[4] Likewise, Dr. Ian Shaw of Liverpool University and Paul Nicholson of Cardiff University write that "the Egyptian year was considered to begin on . . . the date of the heliacal rising of the Dog Star, Sirius."[5]

When we observe the daily cycle of Sirius, or indeed of any other star that rises and sets, the place of rising in the east will always be the same—that is, it will have the same azimuth.[*45] By placing two or more markers in a straight line aimed at the rising place of a star, such as the upright stones placed at Nabta Playa, an observer can witness that same star rising at that same spot each day. Strictly speaking, however, this is not quite true, for the star has, in fact, moved a bit, but so minute is this movement in one day—about 0.00004 of a single degree—that it is not possible to notice except with the finest optical instrument. This slight progressive movement is due, as we have seen in previous chapters, to the precession of the equinoxes—that slow, gyrating motion of Earth, one full cycle of which takes about twenty-six thousand years. Yet although it is not perceptible on a daily or even yearly basis, we can notice it over the span of a human life. For each seventy-two years the change in rising position will be about 1 degree—that is, about the thickness of a thumb with the hand outstretched.[†46]

Because the prehistoric star watchers of Nabta Playa observed the rising of stars over several generations and had originally marked their rising points with straight lines of stones, they would surely have become aware that the rising position changed over time. As we have seen in chapter 4, there is even evidence they had a subtle and elegant concept of precessional motion. According to the latest estimates of Wendorf and Schild, Nabta Playa began functioning as a regional ceremonial center during the Middle Neolithic (6100–5500 BCE) and remained in use until about 3500 BCE—thus for at least two millennia of stellar observations. There is also evidence that the site was visited as far back as the early Holocene Period (9000–6100 BCE), thereby giving an even longer observation period. They further explain that "[f]ollowing a major drought which drove earlier groups from the desert, the Late Neolithic began around 5500 BC with new groups that had a complex social system expressed in a degree of organization and control not previously seen. These new people, the Cattle Herders (also known as Ru'at El Baqar people) appear to have been responsible for the ceremonial complex at Nabta Playa. The newcomers had a complex social system that displayed a degree of organization and control not previously seen in Egypt."[6]

We saw in chapter 4 that the people of Nabta focused their social system that displayed a degree of organization and contol onto creating a megalithic astro-ceremonial complex. One primary feature of that complex was repeated alignments to the rising of Sirius and to the circumpolar Bull's Thigh stars. We might ask, then, why the ancient astronomers of Nabta Playa also marked the rising of the star Sirius. What significance could this have had? In asking this, we are suddenly reminded that this star had its so-called heliacal rising at around the summer solstice, and that it was at this time of year that there began the monsoon rains that filled the lake at Nabta Playa. We can also remember that there was indeed such a summer solstice alignment at Nabta Playa defined by the so-called gate of the calendar circle. Was it possible that these alignments had been intended to work together in order to mark a direction as well as a specific time of year? In other words, could the astronomy of Nabta Playa have served as a point that gave a specific direction at a specific time of year? If so, what did it point to, and at what time of year?

MOVING EAST TOWARD THE NILE VALLEY

Around 6000 BCE, the heavy monsoon rains began to come regularly during the summer solstice season to fill the large depression at Nabta Playa, turning it into a shallow, temporary lake and the region around it into lush prairies that were idyllic for grazing cattle. Further, it was this hydraulic miracle that attracted the so-called Ru'at El Baqar, or cattle people, every monsoon season. Year after year, the cattle people came around the time of the summer solstice to set up camp, graze their cattle on the thick, soft grass along the playa, and remain until the lake eventually dried up some six months later, in midwinter.

In this southern region of the Egyptian Sahara the summer nights are warm and crystal clear, and the starry firmament is a truly marvelous sight to watch. It looms above like a giant cupola or a canopy of twinkling lights that very slowly but perceptibly move majestically from east to west. The constellations appear to be so close that we might be tempted to ignore common sense and reach out to touch them. In these nightly displays, the cattle people had ample time

to study the stars, perhaps even name some of the brighter ones and define the more striking of the constellations, such as Orion and the Big Dipper. Surely they passed down their star lore over many generations. Because they were so dependent on their cattle, it was appropriate that they might have noticed that the seven-star asterism of the Big Dipper looked uncannily like the leg of a cow or bull, and that the large constellation of Orion appeared to be a striding giant herdsman holding a staff. Further, it was most likey apt that the heliacal rising of the brightest star of all, Sirius, which hung below Orion's foot, was seen as a sort of beginning or rebirth or, better still, the start of the year to mark the fertility of the coming lifegiving monsoon rains. Certainly these assumptions occurred to Wendorf and his team when they worked at Nabta Playa, for it was reported in *The New Scientist* that

> by 1998, Wendorf 's team had found megaliths scattered right across the western edge of the playa. Hoping to fathom what the nomads were up to, Wendorf invited University of Colorado astronomer Kim Malville to Nabta. Malville confirmed that the stones formed a series of stellar alignments, radiating like spokes from the site of the cow sculpture [Complex Structure A]. One of the alignments points to the belt of Orion, a constellation that appears in late spring. Three more indicate the rising points of Dubhe, the brightest star in Ursa Major [Big Dipper], which the Pharaohs saw as the leg of a cow. Most intriguing, though, is the parade of six megaliths marking the rising position of Sirius—the brightest star in the sky—as it would have appeared 6800 years ago. By that time, says Wendorf, the rains would have started their gradual retreat, and the alignments may have been an attempt to seek help from supernatural forces. To Malville, this seemed an incredible coincidence. Sirius was also of great importance to the civilisations of the Nile, which worshipped it as Sothis. The earliest known Egyptian calendars were calibrated to Sothis's appearance as a morning star, when the days were longest and monsoon rains flooded the crop fields along the Nile. Sothis was depicted as a cow with a young plant between her horns. To later dynasties, Sothis was known as Hathor—mother of the pharaohs.[7]

We have seen that around the fifth millennium BCE the cattle people worked out a way to stay permanently at Nabta Playa by digging deep wells to sustain them through the six months when the lake was dry from midwinter to midsummer. Now they could grow some basic cereal crops and hunt hare and gazelle that also came to the lake when it was full. They rarely, however, slaughtered their own cattle, for these were now considered sacred. They only used them for milk and perhaps blood, very much like the Masai herders of eastern Africa.[*47]

With plenty of leisure time on their hands in the evenings and at night, their knowledge of the sky and its cycles increased, and the cattle people thus began to develop complex ideologies of life and death and to devise rituals and ceremonies to mark special days of the year. They gradually built the vast ceremonial complex we see today, using large stones quarried from the nearby bedrock. In the intellectual and spiritual sense, they moved a few steps up the cultural ladder to discard their cattle-people descriptor and become the Ru'at El Asam people, the megalith builders or, as we now prefer to call them, the star people.

Thus life for these people went on peacefully for generations until around 3300 BCE, when huge changes in the climate caused the lake to recede and the wells to dry up. It soon became obvious that they could not stay here much longer. For centuries they had heard of a wonderful river valley in the east, a cornucopia of plenty, with miles upon miles of banks of green pastures—a place where food and fresh water could be found in abundance. Indeed, their distant ancestors had trade relations with the people of the Nile Valley and even more distant regions. Therefore, forced out by the climate and lured by the legend of the great river, the people of Nabta Playa turned their attention east, toward the place of the rising sun, and dreamed of a new life in the green valley yonder. When they could stay in the desert no more, they rounded up their cattle, packed their meager belongings, and, leaving the ceremonial complex with its stone circle, tumuli, and alignments that their ancestors had raised, they started their march to a new promised land. According to one of the most prominent anthropologists of the Egyptian Sahara, Romuald Schild writes, "And where might they have gone if not to the relatively close Nile Valley? They brought with them the various achievements of their culture and their belief system. Perhaps it was indeed these people who provided the crucial stimulus towards the emergence of state organization in ancient Egypt." Fred Wendorf echoes these words: "About the time the rains were falling off in the desert, the people in the Nile Valley suddenly started taking an interest in cows, building things with big stones, and getting interested in star worship and solar observatories. Is it possible that the Nabta nomads migrated up the Nile, influencing the great Egyptian dynasties?"[8] Fekry Hassan, professor of Egyptology at London University, adds: "It is very likely that the concept of the cow goddess in dynastic Egypt is a continuation of a much older tradition of a primordial cow goddess or goddesses that emerged in the context of Neolithic herding in the Egyptian Sahara."[9]

The modern town of Abu Simbel lies only 100 kilometers (62 miles) due east of Nabta Playa—three to four days' journey on foot. This would have been the most obvious route to take to reach the Nile Valley. We recall, however, that the central theme of the desert peoples' cosmological beliefs was fixated on the summer solstice sunrise—the time when both sunrise and the appearance of Orion and Sirius at dawn heralded the monsoon rains that brought life to the desert. Now that the rains came no more, however, did they still look toward the summer solstice for guidance? What propitious sign might the cattle people have taken? The Calendar Circle's summer solstice has an alignment to azimuth of about 62 degrees—that is, the place of sunrise at summer solstice. Was this a sort of prehistoric pointer for an exodus from Nabta Playa toward the Nile Valley? Was there among the star people of Nabta Playa a prehistoric Moses who led the way toward the rising sun and took his people toward a promised land in the east? At summer solstice the sun remains at more or less the same place for about eight days, with a variation of azimuth as little as 2-arc minutes.[10] This means that the party of people leaving Nabta Playa had ample time to reach the Nile Valley by walking toward the sunrise. To where might this direction of azimuth 62 degrees have finally led them?

THE SACRED ISLAND OF ELEPHANTINE

The region of Aswan is some 250 kilometers (155 miles) northeast of Nabta Playa. A party traveling from Nabta Playa toward the rising sun at summer solstice would have reached Aswan after a journey of four to five days. This region is without doubt the choicest place to settle in the Nile Valley. The climate is perfect, with sunshine throughout the year, and at Aswan the river is at its very best—wide with clean, clear water dotted with beautiful islands, the most beautiful being the island of Elephantine.

Elephantine, as far as islands go, is rather small. It is 1.2 kilometers (.75 mile) long and 0.5 kilometer (.3 mile) wide and is located downriver within sight of the first cataract[*48] and opposite the modern town of Aswan. Today half of the island has been developed into a tourist resort, but the remainder is an archaeological wonderland that contains the great temple of Khnum and the lovely temple of the goddess Satis, as well as many other ancient vestiges from the entire age of ancient Egypt. There are no bridges that link the island to the mainland; it can be accessed only by boat or ferry. On the east of the island and across the river is the lush Nile Valley, to the west are high sand dunes, and beyond them is the open desert. The Nile here is at its widest, about 1 kilometer (.62 mile), and the water is clear, cool, and wonderfully refreshing. The banks are lined with palm and banana trees, and there are many colorful bougainvillea and oleander trees. Sunset brings hundreds of white egrets to perch on the trees, and there they look like winged snowflakes or angels. At daybreak the water buffaloes, Egypt's most ancient and strongest beasts of labor, graze in the shallows while local women do their laundry. Here, life is as it has always been for thousands of years: peaceful, serene, and timeless. An enthusiastic seventeenth-century English traveler, George Sandys, wrote of this place:

> . . . than the waters whereof there is none more sweete: being not unpleasantly cold, and of all others the most wholesome. Confirmed by that answer of Pescenius Niger unto his murmuring soldiery, "What? Crave you wine and have Nilus to drinke of?" . . . So much it nourisheth, as that the inhabitants thinke that it forthwith converteth into bloud. . . . Besides it procureth liberall urine, cureth the dolour of the veins, and is most soveraigne against that windy melancholy arising from the shorter ribs, which so saddeth the mind of the diseased.[11]

In very ancient times, Elephantine was the capital of the First Nome (district) of Upper Egypt. It was considered a place sacred to Khnum, the ram-headed creator god who is said to have fashioned humankind on his potter's wheel. Khnum's consort was the goddess Satet—also known as Satis. The notoriety of Elephantine rested on the belief that it was here where the floodwaters emerged from the underworld, or Duat, to rejuvenate the land of Egypt.[12]

The goddess Satis was regarded as the protector of Egypt's southern frontier, and as such she was depicted holding a bow and arrows. She was also the guardian of the source of the flood and, as such, was identified with the star Sirius, whose heliacal rising occurred in conjunction with the beginning of the flood season.[13] The goddess Satis is attested in ancient texts as early as 2700 BCE, and her name is found on pottery as far north as Saqqara, nearly 900 kilometers (559 miles) from Elephantine. We also find her name inscribed in pyramids of the fourth and fifth dynasties (ca. 2300 BCE), where she is said to purify the body of the dead king with the rejuvenating flood waters brought in jars from Elephantine.[14] Satis is depicted as a tall, slender woman wearing the White Crown of Upper Egypt with antelope horns. In Egypt the antelope lives in the desert, which may symbolize the origins of Satis. On the crown is often drawn a five-

pointed star, which represents Sirius. Her many epithets—Lady of Stars, Mistress of the Eastern Horizon of the Sky at Whose Sight Everyone Rejoices, The Great One in the Sky, Ruler of the Stars, Satis Who Brightens the Two Lands with her Beauty—are clearly allusions to her important identification with the star Sirius.[15] Her beautiful, small temple on Elephantine is just north of the much larger temple of her consort, Khnum. Excavation and restoration of the Satis temple by the German Archaelogy Institute of Cairo has been ongoing since 1969, and although the restored temple that is seen today dates from the Ptolemaic period,[16] beneath it are the remains of several earlier temples, stacked one atop the other like tiers on a wedding cake, going back to the predynastic period. In all, there are seven temples, the lowest being a simple shrine that dates from about 3200 BCE. Above it are two Old Kingdom shrines that date to around 2250 BCE, and above these are two Middle Kingdom temples that date to circa 1950 BCE. These are surmounted by a New Kingdom shrine built by Queen Hatshepsut, around 1480 BCE, and finally, at the very top, is the restored Ptolemaic temple, which dates to the second century BCE.[*49] [17]

In 1983 the American astronomer Ron Wells of the University of California took an interest in the alignments of the many superimposed Satis temples.[18] Working under the aegis of the Swiss Archaeological Institute in Cairo, Wells was permitted to take azimuth measurements of all the temples that were stacked on top of each other. It quickly became obvious to him that the azimuths of the temples differed slightly from one another, progressively changing in a counterclockwise direction. To a trained astronomer, this implied that the ancient builders were tracking the rising point of a celestial object, which changed azimuth proportionally. Ron Wells knew of the symbolic links between the goddess Satis and the star Sirius and thus had a hunch that the changing azimuths of the temple's axes through the epoch may have something to do with the changing azimuths of the rising of Sirius. Making use of the pole star Polaris (Alpha Canis Minor) to establish true north, Wells calculated the azimuth of the topmost (Ptolemaic) temple and found it to be 114.65 degrees. He then calculated the azimuth of the earlier (New Kingdom) temple beneath it and found it to be 120.60 degrees. The 5.95-degree difference in azimuth exactly matched the difference in azimuth of Sirius for the same two epochs![19]

The azimuth changes of the axes of the temples implies an awareness of the precessional shift. Skeptics have argued that successive ancient surveyors were not aware that the older axis was no longer directed to Sirius, and they simply oriented a new temple's axis without being conscious of the change. This may perhaps be an explanation, however, if only one change had taken place; but the original axis was changed at least four times. The ancient surveyors surely must have known that the temple was dedicated to Satis, goddess of the flood linked to the heliacal rising of Sirius, and it seems inconceivable that they did not notice the change in azimuth of the axes of the various temples that were aligned to this star.

More recently, in 2004, the Spanish astronomer Juan Belmonte, along with the Egyptian astronomer Mossalam Shaltout, undertook a new study of the orientations of the superimposed Satis temples and confirmed Wells's measurements as well as the orientation of the lowest, and thus oldest, shrine: "The archaic sacred precinct of Satet [Satis] at Elephantine: this area was enclosed on three sides by three large boulders of granite and opened roughly towards the south-eastern area of the horizon, where the sun rises at the winter solstice and where Sirius rose heliacally in 3200 B.C. The shrine is preserved in a cellar below the concrete terrace where the temple of Satet, erected by Hatshepsut, has been reconstructed."[20]

Interestingly, Wells also determined that the topmost Satis temple had been aligned to other star systems. One set of alignments was toward Orion's belt and another set was toward the Big Dipper. These were the very same constellations and stars to which the various alignments of the ceremonial complex at Nabta Playa had been directed thousands of years before. This was too much of an actual coincidence to be merely accidental. We can recall that it was, indeed, from this location that the ancient Egyptian governor of Aswan and Elephantine, the explorer Harkhuf, launched his epic journeys to the kingdom of Yam. Harkhuf 's tomb, where are inscribed the stories of his journeys, is located on the west bank of the Nile in the hills almost directly opposite Elephantine Island. It is very tempting to suppose that Harkhuf knew the location of Yam before he set off on his first expedition, because he knew that his ancestors had come from there. The earliest date for the Satis temple is about 3200 BCE, a date that uncannily coincides with the departure of the cattle people from Nabta Playa. Had the latter come here and brought along with them the astronomical ideas that were incorporated into the multileveled temples of Satis?

At Elephantine, in about 3200 BCE, it was not the monsoon rains that brought renewal and regeneration of the land but the Nile's flood, which was the direct result of the monsoon rains that no longer occur in this part of Egypt, but instead occur much farther south, in central Africa. In other words, the same system of astronomical knowledge that was

developed in the Sahara in prehistoric times could have been used in the Nile Valley, because the time of arrival of the monsoon rains exactly matched the time of arrival of the flood, with both occurring at the summer solstice. To be more specific, the flooding of the Nile is caused by the same monsoon rains that flooded Nabta Playa every year, except that the monsoon wind pattern has moved south and is now inundating the great lakes at the source of the Nile, which sends the flood north to the lower Nile. In light of this new evidence, we can therefore see why it was at about 3200 BCE that Elephantine began to acquire great religious importance as the source of the flood.[21]

In 1890, on the small island of Sahal a few kilometers upstream from Elephantine, the American traveler Charles Wilbour discovered hieroglyphic inscriptions on a large boulder protruding from the Nile. Today the boulder is known as the Famine Stele, and the boulder's inscriptions speak of a terrible drought that struck Egypt for seven years due to a series of bad floods in the reign of the pharaoh Djoser, first ruler of the third dynasty (ca. 2650 BCE). In the text of the Famine Stele, King Djoser asks the high official of the region, Mater, from where rose the water of the Nile. Mater replied,

> . . . the Nile flood came forth from the Island of Elephantine whereon stood the first city that ever existed; out of it rose the Sun when he went forth to bestow life upon man, and therefore it is also called Doubly Sweet Life, and that the very spot on the island out of which the flood waters rose from was the double cavern called Querti, which was likened to two breasts from which all nourishment poured forth; here the Nile God lay on a "couch" and waited for the coming of Akhet [the season of inundation], after which he rushed out of the cavern like a vigorous youth and filled the whole country.[22]

From the Famine Stele at Aswan

Year 18 of Horns: Neterkhet; the King of Upper and Lower Egypt: Neterkhet; Two Ladies: Neterkhet; Gold-Horus: Djoser, under the Count, Prince, Governor of the domains of the South, Chief of the Nubians in Yebu, Mesir. There was brought to him this royal decree. To let you know: There is a town in the midst of the deep, Surrounded by Hapy [the Nile; the Nile God], Yebu by name [Elephantine]; It is first of the first, First nome to Wawat, Earthly elevation, celestial hill, Seat of Re when he prepares To give life to every face. Its temple's name is "Joy-of-life," "Twin Caverns" is the water's name, They are the breasts that nourish all. It is the house of sleep of Hapy. He grows young in it in [his time], [It is the place whence] he brings the flood: Bounding up he copulates, As man copulates with woman, Renewing his manhood with joy; Coursing twenty-eight cubits high, He passes Sema-behdet at seven. Khnum is the god [who rules] there, He is enthroned above the deep . . . His sandals resting on the flood; He holds the door bolt in his hand, Opens the gate as he wishes. He is eternal there as Shu, Bounty-giver, Lord-of-fields, So his name is called. He has reckoned the land of the South and the North, to give parts to every god. It is he who governs barley, [emmer], Fowl and fish and all one lives on. Cord and scribal board are there, The pole is there with its beam. . . . His temple opens southeastward, Re rises in its face every day; Its water rages on its south for an iter, A wall against the Nubians each day. There is a mountain massif in its eastern region, With precious stones and quarry stones of all kinds, All the things sought for building temples In Egypt, South and North, And stalls for sacred animals, And palaces for kings, All statues too that stand in temples and in shrines.[23]

This tradition that the island of Elephantine was the source of the Nile and also the source of the annual flood was still current when Herodotus visited Egypt in the fifth century BCE. This is what the Father of History writes about Elephantine:

> . . . [A]s to the sources of the Nile, no one that conversed with me, Egyptian, Libyan or Greek professed to know them, except the recorder of the sacred treasures of Athena [Satis] in the Egyptian city of Saïs. I thought he was joking when he said that he had exact knowledge, but this was his story. Between the city of Syene [Aswan] in the Thebaid and Elephantine there are two hills with sharp peaks, one called Crophi and the other Mophi.[*50] The springs of the Nile which are bottomless, rise between these hills . . .[24]

In the first century, some half-century after Caesar occupied Egypt and turned it in to a Roman province, the chronicler Pliny the Elder reports:

> Timaeus the mathematician has alleged a reason of an occult nature: he says that the source of the river [Nile] is known by the name of *Phiala* [Philae, the island of Isis near Elephantine], and that the stream buries itself in channels underground, where it sends forth vapors generated by the heat among the steaming rocks amid which it conceals itself; but that, during the days of the inundation, in consequence of the sun approaching nearer to the earth, the waters are drawn forth by the influence of his heat, and on being thus exposed to the air, overflow; after which, in order that it may not be utterly dried up, the stream hides itself once more. He says that this takes place at the rising of Sirius, when the sun enters the sign of Leo, and stands in a vertical position over the source of the river, at which time at that spot there is no shadow thrown.[25]

On the latitude that passes near Elephantine, Aswan, and Philae, the sun at summer solstice is positioned nearly vertical at noon, and hence no shadows are cast. This latitude is, of course, the Tropic of Cancer, at 23 degrees 27 minutes north. The famous Alexandrian scholar Eratosthenes knew this and also knew that on that very same day and time in his hometown of Alexandria (which is 900 kilometers, or 559 miles, north of Aswan) the sun would cast a pronounced shadow. He determined that the angle of the shadow at Alexandria was $^{1}/_{50}$ of a full circle (that is, 7 degrees 12 minutes) from the zenith, and he thus reasoned that the distance from Alexandria to Aswan must be $^{1}/_{50}$ of the total circumference of Earth. Because that distance from Alexandria to Aswan, was known to him as 5,000 stadia (some 500 geographical miles), he reckoned that the full circumference of Earth was 252,000 stadia, which is 16 percent more than the true value, but a solid result nonetheless, given the crude method he used. Eratosthenes went down in history as the first to have calculated Earth's size. The irony, however, is that it was the Egyptian priests who had informed Eratosthenes of this phenomenon, which, almost certainly, they had been aware of since time immemorial. Indeed, it may well be for that very reason that the location of Elephantine was regarded by the Egyptians as the first city that ever existed. It may also be the reason why the people of Nabta Playa, who were guided by the summer solstice, came to settle in Elephantine around 3200 BCE.[*51]

At any rate, further inscriptions on the Famine Stele state that Hapy's temple "opens southeastward, and Re [the sun] rises in its face every day,"[26] which implies an alignment toward Sirius, a star that also rises southeast. This conclusion seems correct, and Ron Wells estimated that the entrance to the archaic temple of Satis was directed at azimuth 120.60 degrees, which matched the azimuth of Sirius in around 3200 BCE.[27] [†52]

This date also corresponds to the date of the archaic temple given by Belmonte and Shaltout. Bearing this in mind, in 1981 the German Egyptologist and chronologist Rolf Krauss argued that the Island of Elephantine had been the principal site in all Egypt for observing the heliacal rising of Sirius since at least the time of the Middle Kingdom (ca. 2000 BCE),[28] a deduction with which many researchers agree.[29] All in all, there is much to suggest that the observation of Sirius at Elephantine harks back to the archaic period of 3200 BCE—a date which dovetails with the time when the star people of Nabta Playa abandoned the Sahara.

At Elephantine is one of the oldest nilometers in Egypt. A nilometer is a simple but very effective device used to measure the rising and ebbing water level of the Nile. It basically consists of a stone well with steps that lead down into the river. The wall of this well has graduated marks to measure the level of the river. When the Romans first came to Elephantine in the 25 BCE, along with them came the geographer Strabo, the author of the famous *Geography,* who recognized correctly the function of the nilometer. He describes his visit to Elephantine and the nilometer:

> Elephantine is an island in the Nile, at the distance of half a stadium in front of Syene [Aswan]; in this island is a city with a temple of Cnuphis [Khnum], and a nilometer like that at Memphis. The nilometer is a well upon the banks of the Nile, constructed of close-fitting stones, on which are marked the greatest, least, and mean risings of the Nile; for the water in the well and in the river rises and subsides simultaneously. Upon the wall of the well are lines, which indicate the complete rise of the river, and other degrees of its rising. Those who examine these marks communicate the result to the public for their information. For it is known long before, by these marks, and by the time elapsed from the commencement, what the future rise of the river will be, and notice is given of it. . . .[30]

Although restored in Roman times, the nilometer of Elephantine is probably much older. According to the Famine

Stele inscriptions, King Djoser (2650 BCE) is informed that "there is a town in the midst of the deep surrounded by Hapy [the Nile], Yebu by name [Elephantine]; It is first [town] of the first nome to Wawat [Nubia], [it is known as] 'Earthly Elevation,' 'Celestial Hill,' and 'Seat of Re' when he prepares to give life to every face. Its temple's name is 'Joy-of-life.' 'Twin Caverns' is the water's name, they are the breasts that nourish all. It is the house of sleep of Hapy. He grows young in it in [his time]. [It is the place whence] he brings the flood . . ."[31]

The author of the texts was the high official of the region, Mater. He duly informs King Djoser that the ideal flood is when the water level reaches "twenty-eight cubits high at Elephantine [and that] he [the Nile] passes [the town of] Sema-behdet at seven [cubits]."[32] The name Semabehdet is that of the Seventeenth Nome of Lower Egypt, which borders the coastline of the Mediterranean, some 920 kilometers (572 miles) downstream from Elephantine as the crow flies. Today it is called Tell Balamun. The difference in the level of the Nile between Elephantine and Tell Balamun is about 85 meters (279 feet). This provides the natural fall from south to north, allowing the river to flow northward at about 16 knots.[33] A sudden rise of 28 cubits, nearly 14 meters (46 feet), at Elephantine would bring about a rush of water, causing the banks to overflow and the water to flood the adjacent land. Even so, the flooding of the land could be somewhat controlled—but any higher water levels would cause overflooding and untold structural damage to the land and crops. Any flooding lower than necessary would cause a drought that could lead to food shortage and, eventually, famine. It was thus crucial that some sort of early warning system be installed, hence the nilometer.

Although the nilometer at Elephantine was far from being the refined hydraulic instrument that we would use today, it gave a good indication of what type of flood to expect. Part of the early warning system came from the stars. Around early June, as the sun approached its most northerly rising at the summer solstice, the constellation of Orion appeared again at dawn in the east, followed by Sirius. At this time of year, the nilometer was watched with great care. No wonder, then, that the temple of Satis, divine protector of the Nile and the flood, from where officials monitored the rising of Orion and Sirius, was located only a short distance away from the nilometer of Elephantine. Intriguingly, Ron Wells showed that the ancient designers of the temple seemed to have demarcated the two extreme variations of the Big Dipper constellation as it revolved around the north celestial pole. We can recall how the stars of this particular constellation, as well as those of Orion and Sirius, were specifically used by the star people of Nabta Playa. Yet can such astronomical similarities be regarded as evidence of a progressive cultural link between Elephantine and Nabta Playa?

A new trend in archaeology and cultural anthropology is open to what has been loosely termed *nontangible evidence,* which, as its name implies, cannot be physically evaluated—it does not, for instance, include artifacts. Nonetheless, conclusions are valid because they can be reasoned to be so—there is a sort of silent eyewitness account from the past. Astronomical evidence is nontangible regarding understanding ancient cultures, especially in the case of ancient Egypt. It has been known for some time that the ancient Egyptians performed a very important ritual for aligning their religious monuments toward the sun and stars. From earliest times, they performed a ceremony called stretching the cord to align royal pyramids and temples. This ceremony, which we have seen in chapter 4, required the participation of the pharaoh and a priestess, who assumed the role of a deity called Seshat.

The goddess Seshat was unique among all the other goddesses of ancient Egypt in that she was said to be supremely proficient in the sacred sciences, particular astronomy and sacred architecture. Depicted as a slender woman, Seshat was especially venerated by scribes, for she was also the patroness of the sacred hieroglyph writing and keeper of the royal annals.[34] Her companion-husband was Thoth, the god of wisdom and astronomy, and she often appears next to him on temple reliefs. Such a prestigious union gave Seshat enormous status and respect. Nonetheless, her most important role was participating with the kings in the stretching the cord ceremony to establish the four corners of temples and pyramids and to align them toward specific stars, usually the Big Dipper. In this capacity, Seshat is always shown in a leopard-skin dress with spots that are sometimes shown as stars, which is apparently symbolic of her ability to see in the dark, like the leopard.[35] On her head, Seshat is depicted wearing a golden tiara with a seven-pointed star or rosette. Her many epithets included Foremost in the Library, Mistress of Writing in the House of Life, Keeper of the Royal Annals, and Lady of the Stars.[36] The French scholar Anne-Sophie Bomhard, an expert on the ancient Egyptian calendar, writes, "The recognition of the annual cycle and its definition, the linking of celestial phenomena to terrestrial happenings, are essential preliminaries to establishing any kind of calendar. This enterprise requires long prior observations of the sky and the stars, as well as the recording, in writing, of these observations, in order to verify them over long periods of time. It is quite natural, therefore, that the divine tutors of Time and Calendar should be Thoth, God of Science, and Seshat, Goddess of Writings and Annals."[37]

Egyptologists have established that the stretching the cord ceremony was known since at least 2900 BCE, and it was a "crucial part of a temple foundation ritual."[38] Textual knowledge of this ceremony comes mostly from inscriptions on the temples at Edfu and Dendera, although much earlier evidence is found in drawings and reliefs depicting the ceremony. Sir I. E. S. Edwards, the foremost expert on Egyptian pyramids, writes that

> [i]n spite of the relative late date of the inscriptions referring to the episodes of the foundation ceremonies, there is no reason to doubt that they preserved an ancient tradition. Some indication that similar ceremonies were already current in the Pyramid Age is provided by a fragmentary relief found in the Vth Dynasty sun-temple of Niuserre, which shows the king and a priestess impersonating Seshat, each holding a mallet and a stake to which a measuring cord is attached. The scene is in complete agreement with the text in the temple at Edfu, which represent the king saying: "I take the stake and I hold the handle of the mallet. I hold the cord with Seshat."[39]

During the stretching the cord ceremony, both the Seshat representative and the king carried a peg and a mallet and faced each other, probably from some twenty paces apart. A cord was looped between the pegs while the king and Seshat determined the alignment of the axis of the future temple or pyramid by sighting a specific star in the northern sky. Once the sighting was successfully made, they stretched the cord and fixed the line by hammering the two pegs into the ground with the mallets. From inscriptions at Edfu and Dendera we can read: "[The king says]: 'I hold the peg. I grasp the handle of the mallet and grip the measuring-cord with Seshat. I turn my eyes to the movements of the stars. I direct my gaze towards the bull's thigh [the Big Dipper]. . . . I make firm the corners of the temple . . .'"[40] "[Seshat says]: 'The king stretches joyously the cord, having turned his head towards the Big Dipper and establishes the temple in the manner of ancient times. [The king says]: 'I grasp the peg and the mallet; I stretch the cord with Seshat; I observed the trajectory of the stars with my eye which is fixed on the Big Dipper; I have been the god who indicates Time with the Merkhet instrument. I have established the four corners of the temple. [Seshat says]: 'The king . . . while observing the sky and the stars, turns his sight towards the Big Dipper . . .'"[41]

In the many years that we have investigated the astronomical alignments of Egyptian pyramids and temples, it has often occurred to us that there may be more than just a religious purpose in fixing the axes toward the rising stars or the sun. If we attribute a knowledge of precessional astronomy to the ancient builders—and recent studies have shown that there is much reason to do so[42]—then it is quite possible that these ancient megalith builders may have used their monuments for long-term calendric computations in order to hark backward to distant epochs that had special significance to them. Further, this stretching the cord ceremony may well have been a ritual to verify, upon inauguration of a new temple building site, that the stars in the heavens were continuing to operate as the astronomer-priests expected they should, and so the earthly and heavenly events could be unified in the temple to maintain sacred order. Indeed, as we have seen in chapter 4, all the signatures of the precursor to the stretching the cord ceremony were present at Nabta Playa, even if it was not the same ritual itself.

Yet there is more evidence that Old Kingdom temples were in fact encoded with sophisticated calendar functions, but to verify this we must first grasp the essential features of the ancient Egyptian calendar and how it may have been applied to such a lofty purpose.

THE TIME MACHINE OF THE ANCIENTS

Today we need not have years of direct observations of the night sky to be initiated into this ancient system of astral knowledge, for with the use of sophisticated astronomy software such as StarryNightPro plus a common home computer, we can speed up the cycles of the celestial bodies to condense a year into a minute—or even, at the touch of a button, hop into the distant past or future. All it takes to operate such user-friendly software is basic knowledge of celestial mechanics and a keen interest in the sky. Nonetheless, we must consider the sky from the perspective of the ancient stargazers of Egypt, and for this we must understand how they computed short- and long-term cycles for their timekeeping needs.

A SENSE OF ETERNITY

The so-called civil calendar of ancient Egypt was a timekeeping device of elegant simplicity. It had the amazing benefit of requiring no adjustment as well as serving as a device for eternity. "The quest for Eternity," wrote the French scholar

Anne-Sophie von Bomhard, "was the most essential preoccupation of the Egyptian civilization."[43] The ancient Egyptians sought eternity through understanding of the long-term cycles of the sun and stars. Everything the ancient Egyptians did—all monuments they built, all ceremonies and rituals they performed, all art and writings they created—were inspired by the idea of eternity and how they could become part of it. We need only look at the pyramids to feel their inspiration.

Yet if the pyramids are a monumental legacy to eternity, then surely the ever-flowing Nile and its annual flood are the living expression of it. Herodotus said that Egypt was "the gift of the Nile," and the Egyptians themselves saw the Nile as a sacred river, which had its source in heaven among the stars.[44] The Egyptologist Jean Kerisel writes, "the mystery of the distant sources of the Nile and the inability to explain the mechanism behind the flooding of the river which followed a regular calendar . . . must have nourished the image of divinity and the sense of eternity."[45]

The source of the Nile is the great lakes in the distant south, thousand of kilometers away, in central Africa and Ethiopia. As we have seen, the annual flood is the direct product of the heavy monsoon rains that occur in midsummer, which cause these great lakes to overflow and discharge their waters into the Nile. These very same monsoons once reached the south of Egypt and created temporary lakes such as the one at Nabta Playa. According to standard Egyptology, however, the ancient Egyptians never knew this. Indeed, the source of the Nile—and thus the cause of the annual flood—were not known to modern humans until the late nineteenth century. Given our new evidence, however, we can question to what extent we can say that the ancient Egyptians never knew that the monsoon flooding in the south was the source of the annual Nile floods. Perhaps the ancient Egyptians did not know as we today think of knowing, but in addition to the astronomical evidence, their origin stories suggest they did have some sort of awareness.

The ancient Egyptians represented the Nile as the god Hapy, a plump man with drooping breasts and a belly that implied contentment and fulfillment. They imagined that its source was a cave leading into the underworld, the Duat. Yet the Duat was also a starry world near the Milky Way. The Lord of the Duat was the god Osiris, with whom the dead pharaohs were identified. Thus according to the Egyptologist J. Gwyn Griffiths, "Osiris is especially associated with the Duat, a watery celestial region where he consorts with Orion and Sothis [Sirius], heralds of inundation and fertility. He is also Lord of Eternity . . ."[46] And Mark Lehner writes that "the word for 'Netherworld' was Duat, often written with a star in a circle, a reference to Orion, the stellar expression of Osiris in the underworld. Osiris was the Lord of the Duat, which, like the celestial world (and the real Nile Valley) was both a water world and an earthly realm."[47] The seemingly contradictory fact that there was a celestial Duat and an underworld Duat can be explained by the observation of what actually happens in the sky: the stars journey in the sky after they rise from east to west, and they journey in the underworld—that is, below the horizon—from west to east, after they set. What added to this earth-sky connection for the Duat was the visible feature of a celestial Nile near Orion. As the historian and astronomer Alan Chapman aptly puts it: "was not the life-giving Nile itself reflected in the very heavens themselves, in the form of the Milky Way?"[48] The American Egyptologist Mark Lehner also points out that "the Milky Way was the 'beaten path of the stars,' although it was also a watery way. . . . In fact, the vision is that of the Nile Valley at inundation."[49] Further, the mythologist Lucie Lamy adds: "If Egypt is a reflection of the sky, then divine beings sail on the waters of the Great River which animate the cosmos: the Milky Way."[50] Robert Bauval had published the same idea in 1989 when he wrote, "a major feature of the After-world often mentioned in the Pyramid Texts is the 'Winding Waterway,' which was, in all probability, seen as a celestial counterpart of the Nile."[51]

THE SACRED YEARLY INUNDATION

Each year, the Nile started to swell in mid-June and spilled its water on the adjacent valley. Herodotus, who journeyed in Egypt in the fifth century BCE, commented: "about why the Nile behaves precisely as it does I could get no information from the priests nor yet from anyone else. What I particularly wished to know is why the water begins to rise at the summer solstice, continues to do so for a hundred days, and then falls again at the end of that period, so that it remains low throughout the winter until the summer solstice comes round again in the following year."[52]

What Herodotus wanted to know, and what the Egyptians could not or would not tell him, was that the reason the Nile behaved in its mysterious way was because of the monsoon rains in the distant south, which, in a sense, regulate the flow and level of the river. Even after the monsoons receded south out of Egypt and the rains that had once drenched the dry Sahara each summer came to an end, much of the downpour of the rainwaters did, in fact, still reach Egypt via the Nile.

Like the Nabta Playa prehistoric stargazers before them who experienced monsoon rains, the ancient Egyptian astronomers could not help but notice that the annual arrival of the flood occurred when the sun rose at its most northerly position on the eastern horizon—that is, at summer solstice. The common view among scholars is that this prompted the ancient stargazers of the Nile to count the number of days between each cycle, reaching the conclusion that it took 365 days[*53]—a year—which furthermore made the summer solstice their New Year's Day.

If we observe sunrise from the same place each day, we can notice that the sun changes position along the eastern horizon between two extreme points: the summer solstice to the far left (north) of due east, and the winter solstice to the far right (south) of due east. At these two extreme points, the sun appears to be stationary for a week or so, hence the term *solstice,* from the Latin, which means "stationary sun." In our modern Gregorian calendar, the summer solstice falls on June 21 and the winter solstice falls on December 21. The sun's journey from one solstice to the other and back takes 365 days, which we call one year. Most historians agree that this discovery was made first in Egypt in the fourth millennium BCE. As we have seen, however, the evidence now strongly suggests that the discovery was made much earlier, in the Egyptian Sahara, and was then imported into the Nile Valley by the Black people that traveled there from Nabta Playa. Admittedly, this discovery was probably refined a few centuries later—most likely, sometime around 2800 BCE—by the ancient Egyptians (by the sun priests of the Great Sun Temple at Heliopolis, near modern Cairo) to produce a sophisticated calendar with weeks and months.

Egyptian calendar divisions

The civil (Egyptian) calendar was divided in the following manner: twelve months of thirty days, with each month having three weeks, or decades, of ten days. The twelve months amounted to 360 days to which were added five days known as the Epagomenal Days, or Five Days upon the Year, thus making up the full 365-day year. The Egyptian year had only three seasons of four months each: the first season, called Akhet, meaning "inundation," from months 1 to 4; the second season, called Peret or Proyet, meaning "emergence" or "coming forth," from months 5 to 8; and the third season, called Shemu, meaning "harvest," from months 9 to 12. Originally, the months were not given names but were assigned only numbers from one to twelve. The first day of the first month of the first season was known as I Akhet—that is, month I, season Akhet, day 1. Later in the New Kingdom, the months received official names: (1) Thoth, (2) Phaopi, (3) Athyr, (4) Choiak, (5) Tybi, (6) Mechir, (7) Phamenoth, (8) Pharmuti, (9) Pachons, (10) Payni, (11) Epiphi, and (12) Mesore. Egyptologists and historians can never agree on the age of the Egyptian calendar. There is, however, much evidence to support the conclusion that the calendar was already in place during the Old Kingdom.

The solar (tropical) year is, in fact, longer than 365 days by a very small fraction, almost a quarter of a day. The exact value of the year is 365.2422 days. Today, to keep our modern Gregorian calendar synchronized with the seasons, we add one day every four years to the year, making the lengthened year what is known as a leap year. Evidence suggests that even though the ancient Egyptians were aware of this shift, they did not have a leap year but simply let their calendar drift relative to the seasons. This, by necessity, created a long-range cycle of 1,460 years—(365 × 4 = 1,460)—and can be seen as a Great Solar Cycle. It so happens that the ancients also observed the rising of stars, and they chose the heliacal rising of Sirius as a marker of the New Year. This means that their civil calendar New Year also drifted relative to the astronomical Sirius New Year at the rate of one day every four years, creating the same cycle of 1,460 years, which scholars call the Sothic cycle (because Sothis is the ancient name for Sirius). [53] The peculiarity of the annual cycle of Sirius (or indeed any star that rises and sets) is that it will seem to disappear for a period of time—that is, it is hidden from view (because the star is up only in daylight). This period was about seventy days in the case of Sirius in ancient Egypt, after which it reappeared at dawn in the east. This first reappearance at dawn is known as the heliacal rising. The heliacal rising of Sirius was significant to the ancient Egyptians for two reasons: it took place near the summer solstice and also appeared at the start of the flood season.[54]

The Heliacal Rising of Sirius

The rising time of stars is delayed by nearly four minutes each day. If we watch Sirius's rising in early August, the rising will be at dawn. In late October, the rising is at midnight. Sirius's rising in early January is at dusk. There is a period from late January to late May in which Sirius has already risen in daylight and seems to emerge out of the sky as the dome darkens after sunset (that is, the sky becomes dark enough for us to see the spot of light that is Sirius). If we were at the Giza pyramids in early March and we looked due south at dusk, Sirius would emerge from the sky directly over the Great Pyramid. At one point in the year—in late May—Sirius can be seen hovering just over the western horizon after sunset. In the days that follow this, the star will not be seen anymore, because it is now too close to the sun's light for its own light to be seen. Sirius remains thus invisible for about seventy days, until August 5, when it rises anew before sunrise in the eastern horizon. This first dawn rising of Sirius is technically known as the heliacal rising of Sirius and was seen by the Egyptians as the rebirth of the star.

BLACK GENESIS: YEAR ZERO

We in the modern world consider the Year Zero of our calendar to be the presumed birth of Jesus, which, today, is thought to have been 2,010 years ago.[*54] This, however, is purely an arbitrary date. Indeed many other people—such as the Muslims, the Jews, the Chinese, and the Japanese—had (and some still have) other Year Zeroes for their own calendars. Usually, years are numbered from the date of a historical person, either an ancient person, as in the case of the Muslim, Jewish, and Christian calendars, or a sequence of emperors, as in ancient China or modern Japan, where legal documents are dated "year Heisei 22."

When was the Year Zero of the ancient Egyptians? How can we calculate its date? This is where we can note an interesting issue regarding study of the drift of the civil calendar relative to the heliacal rising of Sirius.

Sirius was known as the Sparkling One, the Scorching One, or, less flatteringly, the Dog Star or Canicula.[†55] These epithets derived from the fact that the heliacal rising of this star occurred in midsummer, when the sun was at its hottest—the so-called dog days of the Roman year. The Greeks called this star Sothis, a name that perhaps derived from the ancient Egyptian Satis, the goddess of the Nile's flood at Elephantine whom the Egyptians identified with Sirius.[55]

Modern astronomers know it as Alpha Canis Major or by its common name, Sirius. It is the star that shines the brightest in the sky—its brightness in absolute terms is twenty-three times the brightness of our sun. It is also twice as massive as our sun and much hotter, and its 9,400-degrees-Kelvin temperature makes it appear to be brilliant white. The American astronomer Robert Burnham Jr. tells us that it is "the brightest of the fixed stars . . . and a splendid object throughout the winter months for observers in the northern hemisphere."[56] The star Sirius, however, does not stand alone. It is, in fact, part of a bright constellation we call Canis Major, the Big Dog, which trails behind Orion the Hunter. As the brightest of all the visible stars, Sirius is almost ten times more brilliant than any other star and can be seen in broad daylight with the aid of a small telescope. Its color is a brilliant bluish white. Quite simply, it is the crown jewel of the starry world.

When the very first pyramid in Egypt was built around 2650 BCE, Sirius rose at azimuth 116 degrees near modern Cairo. In 6000 BCE, when the prehistoric astronomers of the Sahara also observed it, Sirius rose at azimuth 130 degrees at Nabta Playa. As we can see in appendix 1, in the centuries around 11,500 BCE, Sirius rose almost due south at azimuth 180 degrees as seen from the Cairo area. It is a well-established fact that the Egyptians observed the rising of Sirius, especially its heliacal rising, since at least 3200 BCE. Because of the effect of precession, the time and place on the horizon of the heliacal rising of Sirius will slowly change. Today it takes place in early August. In 2781 BCE the rising occurred on June 21, the day of the summer solstice, when the Nile also began to rise with the coming flood. Of course, this propitious conjunction—the summer solstice, the heliacal rising of Sirius, and the start of the flood season—would have been so for the prehistoric people of the Sahara, except that it was the playa flood season that started with the monsoon season.

The Nile and the New Year

The summer solstice may have originally marked the first day of the civil calendar. This idea was first proposed in 1894

by the astronomer Sir Norman Lockyer. The German chronologist E. Meyer also proposed it in 1908. Recently the Spanish astronomer Juan Belmonte revived this idea and further proposed that the summer solstice was the basis of the original calendar. According to the archaeoastronomer Edwin C. Krupp:

> In ancient Egypt this annual reappearance of Sirius fell close to the summer solstice and coincided with the time of Nile's inundation. Isis, as Sirius, was the "mistress of the year's beginning," for the Egyptian New Year was set by this event. New Year's ceremony texts at Dendera say Isis coaxed out the Nile and caused it to swell. The metaphor is astronomical, hydraulic, and sexual, and it parallels the function of Isis in the myth. Sirius revives the Nile just as Isis revives Osiris. Her time of hiding from Set is when Sirius is gone from the night sky. She gives birth to her son Horus, as Sirius gives birth to the New Year, and in texts Horus and the New Year are equated. She is the vehicle for renewal of life and order. Shining for a moment, one morning in summer, she stimulates the Nile and starts the year.[57]

The British astronomer R. W. Sloley reminds us, and with good reason, that "ultimately, our clocks are really timed by the stars. The master-clock is our earth, turning on its axis relative to the fixed stars."[58] Further, the American astronomer and director of the Griffith Observatory in Los Angeles, Ed Krupp, points out that "celestial aligned architecture and celestially timed ceremonies tell us our ancestors watched the sky accurately and systematically."[59] What we may most want to know is whether Egyptians also used the stars for long-term computations of time, such as the Sothic cycle of 1,460 years. Perhaps this is why the ancient Egyptians deliberately opted not to have the leap year—so that their slipping calendar could also work for long-term Sothic dates.

Providence would have it that a Roman citizen named Censorinus visited Egypt in the third century CE and witnessed the festivities in Alexandria that marked the start of a new Sothic cycle. This is what he reported: "The beginnings of these [Sothic] years are always reckoned from the first day of that month which is called by the Egyptians Thoth, which happened this year [239 CE] upon the 7th of the kalends of July [June 25]. For a hundred years ago from the present year [139 CE] the same fell upon the 12th of the kalends of August [July 21], on which day Canicula [Sirius] regularly rises in Egypt."[60]

To put it more simply, the Egyptian New Year's Day (1 Thoth of the Egyptian calendar) recoincided with the heliacal rising of Sirius in the year 139 CE.[*56] Egypt was at that time a dominion of Rome and was ruled by Emperor Antonius Pius. This calendrical-astronomical event was clearly regarded as having great importance and was commemorated on a coin at Alexandria bearing the Greek word *AION,* implying the end or start of an era. At any rate, this information provided modern chronologists with an anchor date from which they could easily work out the start of previous Sothic cycles by simply subtracting increments of 1,460 years from 139 CE. Thus we know that Sothic cycles began on 1321 BCE, 2781 BCE, 4241 BCE, and so forth. Yet do the Sothic cycles hark back ad infinitum, or is there a Year Zero, as in other calendrical systems?

Even though the ancient Egyptians were obsessed with the idea of eternity, they also believed in a beginning of a secular time they called Zep Tepi, literally, the First Time. The British Egyptologist Rundle T. Clark comes tantalizingly close to the very heart of ancient Egyptian cosmogony when he writes that all rituals and feasts, most of which were linked to the cycle of the year, were "a repetition of an event that took place at the beginning of the world."[61] According to Clark,

> This epoch—*zep tepi*—"the First Time"—stretched from the first stirring of the High God in the Primeval Waters. . . . All proper myths relate events or manifestations of this epoch. Anything whose existence or authority had to be justified or explained must be referred to the "First Time." This was true for natural phenomena, rituals, royal insignia, the plans of temples, magical or medical formulae, the hieroglyphic system of writing, the calendar—the whole paraphernalia of the civilization . . . all that was good or efficacious was established on the principles laid down in the "First Time"—which was, therefore, a golden age of absolute perfection . . .[62]

The start of Sothic cycles, as we have seen, can be computed simply by moving backward or forward in increments of 1,460 years using Censorinus's anchor point of 139 CE. At the resulting years of Sothic cycles, the heliacal rising of

Sirius coincided with New Year's Day (1 Thoth) of the calendar of ancient Egypt, but can we track these cycles back to Zep Tepi, the First Time . . . to the Year Zero of this calendar?

THE GREAT PYRAMID AND ZEP TEPI

In 1987, Robert Bauval sent a paper to the academic journal *Discussions in Egyptology* presenting a new and controversial theory on the Giza pyramids. The theory had been developed when, in 1983, Bauval was working in Saudi Arabia in the construction industry. One night while there, in the open desert, he made an unusual discovery involving the stars of Orion's belt and the Giza pyramids. While looking at the three stars of Orion's belt, it struck him that their pattern and also their position relative to the Milky Way uncannily resembled the pattern formed by the three pyramids of Giza and their position relative to the Nile. This curious similarity did not seem a coincidence, for not only did the ancient Pyramid Texts identify Orion with the god Osiris, who in turn was identified with the departed kings, but the ancient Egyptians also specified Orion as being in the celestial Duat.[63] The correlation between the three stars of Orion's belt and the three pyramids of Giza was striking, if only for one reason: Orion's belt is made up of two bright stars and a less bright third star. This last is slightly offset to the left of the extended alignment created by the two other stars, much the same way that the third, smaller pyramid is slightly offset from the other two.

A fact that adds to this correlation was discovered in 1964 by two academics from UCLA, the Egyptologist Alexander Badawi and the astronomer Virginia Trimble, who proved that a narrow shaft emanating southward and upward from the King's Chamber in the Great Pyramid had once pointed to Orion's belt in about 2500 BCE, the date traditionally ascribed to the building of this monument. Later, in 1990, Bauval published another article in *Discussions in Egyptology* showing that from the Queen's Chamber is another shaft that points to the star Sirius at that same date. In 1994, Bauval published *The Orion Mystery,* which presented his theory to the general public.[*57]

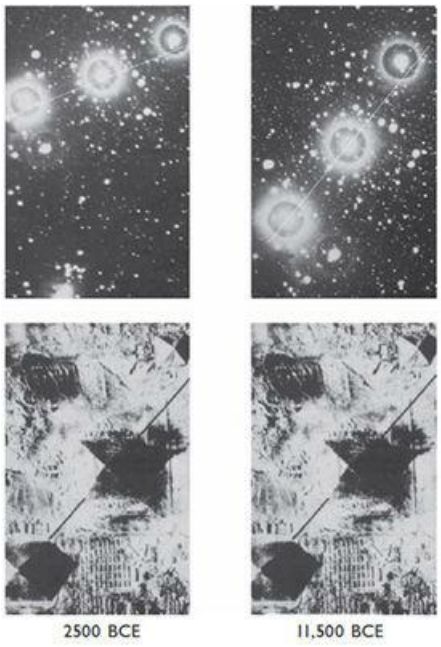

Figure 6.1. The pyramids of Giza and the stars of Orion's belt as they appeared in 2500 BCE and 11,500 BCE

The book, which has been the subject of numerous television documentaries, caused quite a stir at the time of its publiction and is still the subject of much controversy. More recently, in his book *The Egypt Code,* Bauval puts forward the final conclusion that the Giza pyramids may have been modeled on an image of Orion's belt not at the time of their presumed construction circa 2500 BCE, but at a much earlier time, circa 11,450 BCE. In other words, in deciphering the astronomy embedded in the design of the Giza pyramids, we can note the locking of two dates: 2500 BCE, which marks the time of construction, and 11,500 BCE, which marks the significant time that might allude to the First Time—Zep Tepi. This is our reasoning: If today you observe from the location of Giza the star Sirius cross the meridian it will be at 43 degrees altitude. If you could see the same event in 2500 BCE when the Great Pyramid was built, Sirius would have culminated at 39.5 degrees altitude, which is where the south shaft of the Queen's Chamber was aimed. Going even further in time the altitude of Sirius would drop and drop until, at about 11,500 BCE, Sirius would be just 1 degree altitude. Beyond this date Sirius would not have been seen at all because it would not break above the horizon.

In appendix 1 we look in detail at the motion of Sirius and find that Giza was actually the place on Earth where Sirius went down to rest briefly exactly on the horizon at the lowest point of its twenty-sixthousand-year cycle, and that occurred basically in this same epoch, circa 12,280 BCE. Further, we find that the light of the Mother of All Pole Stars, Vega, shone down the subterranean passages at Giza and Dashur in the same epoch, 12,070 BCE. In appendix 1 we also review how the Orion's belt-to-pyramids layout dates are also in this same general epoch. It is now well accepted that in the Great Pyramid the southern shaft of the Queen's Chamber marks the date of 2500 BCE, around the construction date of the monument—but what other shaft elsewhere in the Great Pyramid marks Zep Tepi?

The internal design of the Great Pyramid has been the source of numerous theories, none of which have provided a satisfactory solution to the many questions it poses or solves the great mystery that has baffled generations of researchers. In spite of this, Egyptologists are nonetheless adamant that the Great Pyramid served a funerary purpose, and they point for evidence to the so-called King's Chamber and the empty and undecorated sarcophagus in this otherwise totally barren and totally uninscribed room. At first this consensus appears convincing, but for the troublesome fact that there are two other chambers in the pyramid: the so-called Queen's Chamber, which lies some 21 meters (69 feet) beneath the King's Chamber, and also the so-called subterranean chamber that is 20 meters (66 feet) beneath the pyramid's base and cuts into the living rock. At a loss to explain why three sepulcher chambers would be needed for only one dead king, Egyptologists for a long time had assumed that the subterranean chamber and the Queen's Chamber were abandoned and that the ancient architect had for some reason changed his design three times regarding where the burial chamber should be. Today this abandonment theory has itself been abandoned. Most modern architects and construction engineers believe the entire monument was constructed according to a well-established plan, which was executed without any major alterations. There is, too, the nagging fact that no mummy or corpse was ever found in the Great Pyramid or, for that matter, in any other royal pyramid in Egypt. True, many pyramids contained empty sarcophagi, but this does not necessarily mean that these sarcophagi were meant for dead bodies. They could easily have served a ritual function rather than a practical function as coffins. Perhaps the most convincing fact that the Great Pyramid was not a tomb—or at least, not only a tomb—is that its design contains detailed and accurate astronomical and mathematical data that, if properly understood and decoded, seem to suggest a completely different message than that claimed by Egyptologists.

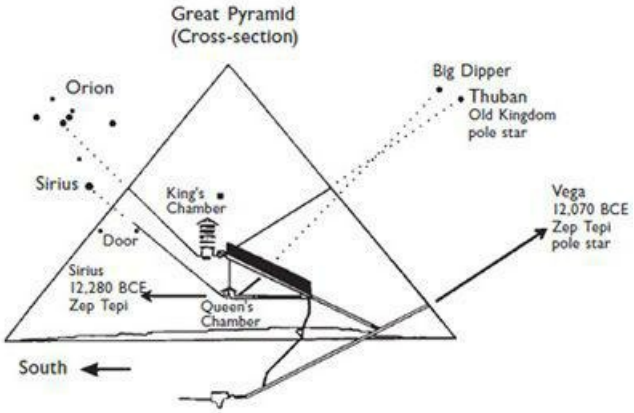

Figure 6.2. The Great Pyramid of Giza's subterranean passage and internal platform aligned to the North Star, Vega, and to Sirius at Zep Tepi. The star shafts built into the upper portions of the completed pyramid aligned to the same and related stars during the Old Kingdom fourth dynasty.

Returning to the question of the date of Zep Tepi and the internal design of the Great Pyramid, the fact that the southern shaft of the Queen's Chamber was aimed at Sirius about 2500 BCE, when the star was at 39.5 degrees and was at essentially 0 degrees in the centuries around 12,200 BCE, when it rested on the horizon as seen from Giza, and the fact that the cycles of Sirius were used by the pyramid builders for both long-term and short-term calendric computations justifies a surmise that the horizontal passage leading to the Queen's Chamber was intended to mark the 0-degree altitude of Sirius at its southern culmination. If the Great Pyramid was designed to symbolize one thing, it is, without question, the sky vault—for the perimeter of the pyramid's square base relative to its height represents the same ratio as the circumference of a circle to its radius. We are to think of the Great Pyramid, therefore, not as a pyramid at all, but as a symbolic hemisphere or as a reduced model of the hemispherical sky vault above it.

The southern shaft in the Queen's Chamber invites us to consider two altitudes of the star Sirius, one at 39.5 degrees and the other at 0 degrees, thus determining two dates: 2500 BCE, which is probably the actual construction date

of the pyramid, and 12,000 BCE, which represents a date in the remote past that has to do with the beginning or first time of the ancient Egyptians' history defined with calendrical computations of the Sothic cycle and precession cycle of the star Sirius. But is there confirming evidence of such long-term date reckoning in Egyptian pyramid designs?

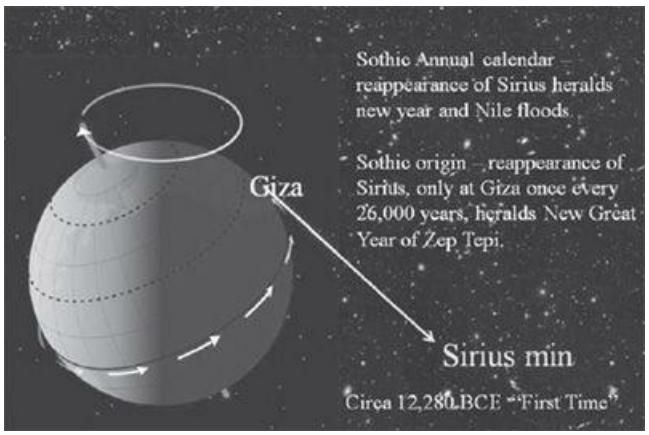
Sothic Annual calendar – reappearance of Sirius heralds new year and Nile floods.
Sothic origin – reappearance of Sirius, only at Giza once every 26,000 years, heralds New Great Year of Zep Tepi.
Giza
Sirius min
Circa 12,280 BCE "First Time"

Figure 6.3. Sirius culminated south so that it just met the horizon—as seen from the latitude of the Great Pyramid at Giza.

THE GREAT WALL OF TIME

In *The Egypt Code,* we demonstrated that evidence of both the Sothic cycle and precession involving the star Sirius could be found in the elaborate design of the step pyramid complex of King Djoser at Saqqara or, more precisely, in the design of the gigantic boundary wall that surrounds the complex (see figure 6.4). The step pyramid complex is dated to about 2650 BCE and is said to be the very first major architectural complex of ancient Egypt and, according to many, the oldest in the whole world. It is one of those curious facts of history that we actually know the name and function of the architect who was responsible for its design: his name was Imhotep, and he was vizier to King Djoser. According to professor I. E. S. Edwards, "Imhotep's title 'Chief of the Observers,' which became the regular title of the high priest of Heliopolis, may itself suggest an occupation connected with astral, rather than solar observation. . . . It is significant that the high priest of the centre of the sun-cult at Heliopolis bore the title 'Chief of the Astronomers' and was represented wearing a mantle adorned with stars."[64]

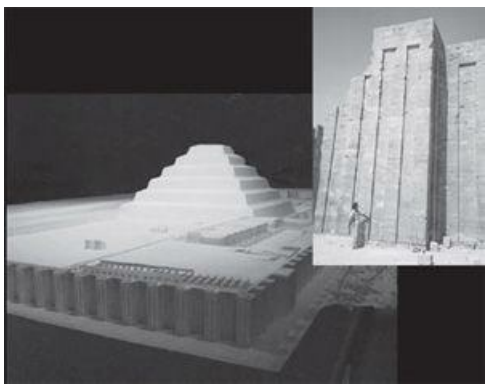

Figure 6.4. Djoser step pyramid complex and Saqqara, showing the massive wall enclosing the compound. Inset: Detail of the reconstructed portion of the paneled wall around the main entrance.

In the recently built museum at the reception area at Saqqara, Imhotep is given a place of honor, and there are several statues representing this Leonardo da Vinci of the ancient world. His name, titles, and functions are attested on the pedestal of a statue of King Djoser. As we have seen, it seems certain that a calendar based on the heliacal rising of Sirius was used since earliest time in Egypt and was referred to sometimes as the Sothic calendar. It also seems certain that this calendar was eventually formally adopted by the Heliopolitan priests, who pinned it to their own newly devised civil calendar, when a Sothic cycle was made to begin with the New Year's Day of 1 Thoth. It is thus quite possible that it was Imhotep who introduced the Sothic calendar based on the cycles of Sirius, or, as we now strongly suspect, merely formalized it from an earlier calendar that was already in place with the prehistoric star people of Nabta Playa. At any rate, much evidence supports the view that a Sothic calendar ran parallel to a civil calendar so that they both

resynchronized every 1,460 years—that is, every Sothic cycle. According to the science historian Gerald J. Whitrow, "there is reason to associate this with the minister of king Djoser of the Third Dynasty known as Imhotep."[65] Bearing this in mind and also recalling that Imhotep was the architect of the very first pyramid complex in Egypt, we would expect to find some indication of the Sothic cycle in the design of his masterpiece, the step pyramid complex at Saqqara.

In *The Egypt Code* we discuss at length the design of the step pyramid complex and the intense astronomical and calendrical quality that it exhibits. Intriguing is a very curious architectural feature called a serdab that is linked to the north face of the step pyramid itself. The serdab consists of a small stone cubicle that is inclined against the slope of the lowest tier of the step pyramid at an angle of about 15 degrees and oriented about 4.5 degrees east of due north. The peculiarity of this cubicle is that inside it was a seated statue of King Djoser, which faces north and seems to look out of the cubicle through two peepholes cut into its north wall. The consensus among Egyptologists today is that the statue was meant to be gazing into the circumpolar region of the sky, where could be found the important constellation of the Big Dipper. Our calculations showed that circa 2650 BCE, when the step pyramid was constructed, the exact spot in the sky on which the gaze of the statue of Djoser seems transfixed was occupied once every twenty-four hours by the star Alkaid, the lowest star in the Big Dipper, which marked the hoof of the Bull's Thigh asterism of the ancient Egyptians. Perhaps the reason behind this alignment was to mark the rising time of the star Sirius in the east. In other words, precisely when the hoof star Alkaid aligned itself with the direction of gaze of the statue in the north, the star Sirius would be seen rising in the east. It is interesting to consider again, as we did in chapter 4, why Imhotep chose to orient Djoser's statue to gaze at the hoof star, Alkaid, instead of the brighter, upper thigh star Dubhe.

The tracking of the rising of Sirius with the Big Dipper would come naturally to an avid stargazer living in Egypt at the time of Imhotep, mainly because an interesting simultaneous alignment took place each day between the culmination of Sirius on the south meridian and the culmination of the brightest star in the Big Dipper, Dubhe, on the north meridian. We will recall from chapter 4 that two important stars tracked by the prehistoric stargazers of Nabta Playa were Dubhe and Sirius. Once such a conjunction is noticed, a person such as Imhotep, who was adept in geometry and astronomy, would realize very quickly that the perpetual circular trajectory of the Big Dipper around the north celestial pole could be used as a sort of dial to mark the rising, culmination, and setting of the star Sirius.

The Big Dipper contains seven bright stars, with the two brightest being Dubhe and Alkaid. These stars appear to revolve around a fixed point, the north celestial pole, in one full day—in other words, they travel in a circular, counterclockwise direction, a bit like the hand of a clock moving backward for twelve hours. If we observe the specific constellations night after night, month after month, and year after year, their cycles eventually become second nature to us and become ingrained in our memory. What Imhotep could not help but notice was that when Sirius rose in the east, the star Alkaid was at about 4.5 degrees east of the meridian. The important pieces for our arugument that Imhotep had to note were (1) when the star Dubhe was at north meridian, the star Sirius was at south meridian, and (2) when the star Alkaid was about 4.5 degrees east of north (and at altitude 15 degrees—the line of sight of Djoser's statue in the small stone cubicle at Saqqara), the star Sirius was rising in the east. If Imhotep was to have access to earlier observations such as, say, those made at Elephantine centuries before or even earlier ones made at Nabta Playa, he would have realized that the position of the star Sirius had changed due to the precession. As we saw in chapter 4, this may explain why Imhotep directed the serdab toward Alkaid rather than to Dubhe. Imhotep, as the designer of the first major architectural complex of Old Kingdom Egypt, may have been paying homage to his distant ancestors who originated this astral ritual at Nabta Playa when the hoof star Alkaid moved into place to initiate the Bull's Thigh constellation as the circumpolar star group that would herald the rise of Sirius. Had he known of an earlier, 365-day calendar, Imhotep would also have realized that New Year's Day had drifted from the heliacal rising of Sirius at the rate of about one day every four years and would synchronize again about every 1,460 years (every Sothic cycle). In addition, the fact that a Sothic cycle had begun in Imhotep's lifetime or just before would certainly have induced him to commemorate this event in his great architectural design of the step pyramid complex. It should come as no surprise, then, that the number 1,460, as we will see, comes up in the design of the massive boundary wall that surrounds the step pyramid complex.

The step pyramid complex of Djoser was named Horus Is the Star at the Head of the Sky,[66] which alone implies some cosmic function related to the principal or brightest star in the sky, which can be only Sirius. This is confirmed by the fact that the god Horus, in very early times, was also identified with this star.[67] The most impressive feature of the step pyramid complex other than the pyramid itself is the huge 10-meter-high (33-feet-high) boundary wall that once enclosed the entire complex. It is a rectangle 550 meters (1,804 feet) long and 220 meters (722 feet) wide, and even today it would be considered a masterpiece of architecture. Rather than simply making the wall with a smooth face, Imhotep incorporated in its design an elaborate system of recesses and protrusions, massive bastions and false doors.

There are no less than 192 recesses and protrusions, 14 false doors, 4 corner bastions, and a main monumental entrance. On all of these features there are vertical panels, each some 20 centimeters (8 inches) wide, 3 centimeters (about 1 inch) deep, and several meters high, some cut into the wall, others flush with it. The west wall contains 1,461 panels and the east side contains 1,458 or 1,459 panels. The south side and north side each contain 732 panels, thus a total of 366 × 4 = 1,464. These numbers, to say the least, speak of calendrical meaning that is specifically related to Sirius, which is very near the Sothic cycle duration (1460 - 1), and 366 implies the sidereal year.[*58] Let us see why.

Sufi Tradition and the Wall

We can note that the design of this massive temple complex enclosure recalls the words of one of our teachers of the ancient meditation technique of *sufi zikr*: the design of all Persian rugs harks back to a very ancient spiritual tradition. If we look at the design of any Persian rug, it always consists of a gardenlike complex enclosed by a very elaborate wall with many recesses and complex meanderings. This design, the sufi said, is a representation of the primordial garden enclosed by a wall with 125,000 doors—and each door, it is said, represents a new way to enter the garden, which opens up each time another human becomes fully enlightened (through sufi or any other yogic practice). The sufi tradition, it is claimed, originates from extremely ancient times. It is interesting to speculate that the geniuspriest Imhotep designed the giant Djoser complex enclosure wall as astronomical-calendrical and developmental-spiritual—thus symbolizing the connection among humans, mind, and cosmos on both a subtle level and in enormous monumental architecture that exists out in plain sight.

First, and most obviously, we consider the number 1,461. As we've noted, the solar year is not exactly 365 days, but has an extra 0.242 day or, approximately, an extra quarter day (as does the Julian year we use today—which is exactly 365.25 years). A peculiarity of the star Sirius, which was apparently known to the ancient Egyptians, was that its yearly cycle was nearly 365.25 days during Old Kingdom times, thus making a Sothic cycle of 365.25 × 4 = 1,461, [68] the same length as the solar-year return cycle and also the number of panels on the west side of the boundary wall of the step pyramid complex.[69]

What, however, of the east wall of the step pyramid complex, which has 1,458 or 1,459 panels, and the north and south walls, which each have 732 panels? The answer emerges if we look in more detail at Sothic cycles. Many historians of astronomy and Egyptian chronologists have often pointed out that the length of the true astronomical Sothic cycle for the heliacal rising of Sirius to return to the exact point in the sidereal year varies slightly, and, according to the British astronomer M. F. Ingham, it ranged during dynastic Egyptian times from 1,450 years to 1,460 years.[70] In appendix 2 we see the nature of Sothic cycles and calculate the length of the Sothic cycles in Old Kingdom times, independently testing Ingham's values by using a slightly different method: we set the year 2781 BCE, the day of summer solstice, as the starting point for a Sothic cycle and to constrain a definition for heliacal rising of Sirius. We then find that the Sothic cycle immediately preceding 2781 BCE was 1,459 Egyptian civil calendar years (1,458 Julian years), and the Sothic cycle starting at 2781 BCE was 1,457 Egyptian civil calendar years. Both those values essentially agree with Ingham's calculations. We conclude, then, that the east wall represents the exact Sothic cycle duration up to the design and construction of the complex, which itself commemorates or inaugurates the correspondence of the heliacal rising of Sirius with the summer solstice (an event that happens only once every twenty-six thousand years). Thus the 1,461-panel wall may reflect a standardized or general public knowledge cycle, and the 1,459-panel wall could reflect the esoteric knowledge of the exact natural cycle known only to initiates such as Imhotep.

Was the Calendar Secret?

Mathematician James Lowdermilk argues that there is evidence that an esoteric or secret tradition did exist.

Evidence of knowledge of the workings of the calendar being held secret is also found in the Reisner papyrus, circa 1900 BCE. If the Egyptian calendar year of 365 days is $^{10}/_{39}$ of a day short of a sidereal year, then it takes 39

÷ 10 = 3.9 years for the calendar to lose one day to the sidereal year, not exactly 4 calendar years. In the Reisner papyrus, a hired scribe wrote the approximation 39 ÷ 10 = 4 even though elsewhere in the papyrus he has correctly worked the problems 30 ÷ 10 and 9 ÷ 10, which when added together give the correct value of 39 ÷ 10, proving his ability (Gillings 1972: 221). Apparently the author of the Reisner papyrus knew or was told that the calculation 39 ÷ 10 was not to be performed in such a profane location as the official registers of a dockyard workshop. Furthermore, when the geographer Strabo (second century CE) wrote of Plato's and Eudoxus's studies in Egypt in the 4th century BCE, he tells us that the Egyptian priests "did teach them the fractions of the day and the night which, running over and above the 365 days, fill out the time of the true year" (Strabo, *Geography,* pp. 83–85). These priests understood that the "true year" contains $^{10}/_{39}$ of a day more than the 365-day calendar year they used, but they were "secretive and slow to impart" this knowledge. (From "Unit Fractions: Inception and Use," in *The Ostracon, Journal of the Egyptian Study Society,* vol. 14, no. 2, Summer 2003. [Note that 365 days plus $^{10}/_{39}$ day gives the length of the sidereal day to within 4 seconds, whereas the crude approximation 365 days plus ¼ day is off by more than 9 minutes.])

The difference, then, of two years represented on the walls progressing in time from east to west could also reflect the changing Sothic cycle—the next one will be two years shorter. Further, the difference between the east and west wall representations, two years, appears to be reflected in the north and south walls, each of which has 732 panels. Two years equal 730 solar days or 732 sidereal days.[*59]

Egyptologists agree that Imhotep lived in the reign of King Djoser during the third dynasty, which, they say, began in the year 2630 BCE. They openly admit, however, that a margin of error of at least one hundred fifty years must be allowed for the early dynasties, thus placing Imhotep as living anytime between 2780 and 2480 BCE.[71] The date 2780 BCE, which could well have been the start of Djoser's reign, now also rings a bell, for it was the year when the summer solstice coincided with the heliacal rising of Sirius and also when, most chronologists strongly suspect, the official civil calendar was set in motion.[72] Therefore, we see that both the calculated value of 1,461 years and the actual value of 1,459 years of the Sothic cycle (which is a combination of the solar and stellar cycles) are expressed on the east and west sides of the boundary wall. Further, the precise difference between these two durations is expressed by the walls that connect them in terms of the number of sidereal days (or star days), which also is a combination of solar and stellar times. Finally, the whole step pyramid complex and the small stone cubicle/serdab are aligned with the Big Dipper to mark the reappearance of Sirius in the east at the one time in twenty-six thousand years that this occurs on summer solstice. All of these facts taken together cannot be a coincidence. The entire complex appears to announce the long-term cosmic cycles of Sirius—how they are measured and predicted and connected to the human-made cycles of the civil calendar, all constructed around the very special time when heliacal reappearance of Sirius coincided with the summer solstice. Of course, this interpretation addresses not only the elegant calendar and cosmic meanings of the wall panel design but also the reason why the step pyramid complex was built at that precise time.

If we accept that Imhotep knew not only that an approximation to the Sothic cycle was 1,461 Egyptian civil years but also the precise duration of the previous Sothic cycle and that this cycle is a combination of solar and sidereal motions, and if we also accept that he had a concept of the difference between the sidereal day and the solar day, then it is highly likely that he was informed by careful observations going back at least one Sothic cycle—that is, back to 4241 BCE, to the period of heavy activity at Nabta Playa.

OTHER EVIDENCE OF THE LONG-TERM TRACKING OF SIRIUS

We have seen that as early as 3200 BCE, the star Sirius was tracked at Elephantine with the changing axes of the multitiered temple of Satis. Yet there are shrines in Egypt other than the step pyramid complex and the Giza pyramid complex that also tracked this special star.

In the area of ancient Thebes (modern Luxor) are the remains of a small temple commonly known as Thoth Hill. The temple was built on a high point in the Theban hills overlooking the Nile Valley below, with a clear view of the eastern horizon. Discovered by George Sweinfurth in 1904 and studied by Sir Flinders Petrie in 1909, the temple has been confirmed to have been built under the reign of King Mentuhotep of the eleventh dynasty. Extensive investigations between 1995 and 1998 by a Hungarian team from Eotvos Lorand University under the directorship of Dr. Gyozo Voros

has led to the conclusion that this temple was sacred to the star Sirius. The structure stands on a terraced platform facing east. After excavating the foundations, the Hungarian team found that this eleventh-dynasty temple was actually built on top of the ruins of an archaic-period temple dating from probably about 3200–3000 BCE, which had a similar floor plan but had an axis 2 degrees farther south: "The Hungarian team that excavated these structures believes this difference may be attributed to the shift in astronomical alignments over the intervening centuries. Their research indicates that the later brick temple was aligned to Sirius. In the archaic period the same star would have appeared just over 2 degrees farther south in the eastern sky—exactly the difference visible in the orientation of the earlier building. Thus, rather than simply follow the physical orientation of the earlier sacred structure, the Middle Kingdom architects had carefully adjusted the temple's orientation in order to align the new building once more precisely to Sirius.[73]

We can recall from chapter 2 that the name of the pharaoh Mentuhotep (ca. 2010 BCE) was found in the inscriptions at Jebel Uwainat in the Egyptian Sahara, which were discovered by Mark Borda and Mahmoud Marai in 2007. If the Black prehistoric people of Nabta Playa were the same people that once occupied Uwainat, and if these people came to the Nile Valley around 3200 BCE and brought along their astronomical knowledge of tracking the stars, especially Sirius, then it is not at all surprising to us now to find that King Mentuhotep knew of an archaic temple at Thebes, which was aligned with Sirius, and, consequently, that he built his own temple above it and knew that its axis had to be 2 degrees farther north.

The whole historical puzzle seems slowly to be taking shape, revealing a remarkable scenario that flows from the astronomical alignments of Nabta Playa as mentioned in the 1998 *Nature* letter of Malville and Wendorf. Before we look at possible conclusions, however, let us examine further evidence that the tradition of the long-term tracking of the star Sirius persisted throughout the whole of pharaonic civilization until its closure around 30 BCE, when it fell under the dominion of Rome.

THOSE WHO FOLLOWED THE SUN

One of the greatest and most magnificent temples of ancient Egypt is the temple of Hathor at Dendera, located on the west side of the Nile near the modern town of Qena, some 60 kilometers (37 miles) north of Luxor. The temple complex stands at the edge of the desert and is so well preserved that from a short distance it looks as though it was built only a few years ago. In fact, the temple is more than two thousand years old, and its origins may even hark back to earliest times.

The cult of the cow goddess Hathor goes back to the archaic period and ranked very high in the Egyptian religion. Evidence of her cult has been detected from the very early dynasties, and many Egyptologists believe that it was even much older than this. Her name, Hat-Hor, literally means House of Horus.[*60] [74]

As such, Hathor was very closely associated with the goddess Isis, mother of Horus. Indeed, so closely identified with each other were these two goddesses that in Ptolemaic times, when the extant temple at Dendera was built, their names were often fused or interchangeable.[75] At Dendera there are tombs that date to the first dynasties, indicating that the site was sacred in very remote, perhaps even prehistoric, times. The temple we see today, however, was founded by Ptolemy XII Auletes in 54 BCE. It is known with certainty that at the same place stood an older temple built under Tuthmoses III around 1450 BCE. In additon, there are inscriptions at Dendera that refer to Pepi I of the sixth dynasty, circa 2350 BCE. More intriguing still, there are inscriptions in a crypt that refer to the Shemsu-Hor, or Followers of Horus,[76] whom the pharaohs regarded as their remote ancestors, although Egyptologists tend to consider these as mythical ancestors.[77] One of these inscriptions actually claims that the original blueprint of the temple was provided by the Shemsu-Hor and was later preserved on the temple walls by Pepi I:

> King Tuthmoses III has caused this building to be erected in memory of his mother, the goddess Hathor, the Lady of Dendera, the Eye of the Sun, the Heavenly Queen of the Gods. The ground plan was found in the city of Dendera, in archaic drawing on a leather roll of the time of the Shemsu-Hor [Followers of Horus]; it was [also] found in the interior of a brick wall in the south side of the temple in the reign of king Pepi.[78]

According to the so-called Royal Papyrus of Turin, also known as the Turin Canon, Egypt was ruled in prehistoric times by the Shemsu-Hor kings (and Shemsu-Hor is commonly translated as the Followers of Horus). Horus was the solar deity par excellence of the Egyptians; he personified the sun, especially when it rose on the horizon. In this specific

role, he was known as Hor-Akhti, Horus of the Horizon, and later, when the cult of Ra, the Heliopolitan sun god, came to power in the fourth dynasty, the two solar deities were united as Ra-Hor-Akhti—literally, Sun God Horus of the Horizon. This union was specific to the morning sun, leading Egyptologists such as Richard Wilkinson to assert that when Ra was "coalesced" with the more primitive Hor-Akhti, this caused the combined deities to become "Ra-Horakhti as the morning sun."[79]

From the many mentions of Hor-Akhti in the Pyramid Texts and other ancient texts, it is clear that the time at which this sun disk was most observed and venerated was not merely at sunrise, but especially at sunrise at summer solstice. This is confirmed in the Pyramid Texts, which say that Horakhti is in the "eastern side of the sky . . . the place where the gods are born [that is, the place where they rise]."[80] It was at the summer solstice, as we have already seen, that the flood season began. The very existence of Egypt depended on the flood—its agriculture, its ecology, and the survival of its people. It is therefore totally understandable that the sunrise at summer solstice would have a very special meaning to the ancient Egyptians—as it had thousands of years before to the prehistoric people of Nabta Playa, who lived by the monsoon rains. If the floodwaters were too low or worse, failed to come, strife and eventually famine would follow. The flood was, quite literally, the jugular vein of Egypt. Nothing frightened the pharaohs more than the possibility that the gods would fail to bring forth the flood. The early warning signal came from Elephantine, where the nilometer was carefully monitored at the time of the summer solstice. As Egyptologists Peter Shaw and Paul Nicholson explain: "Egypt's agricultural prosperity depended on the annual inundation of the Nile. For crops to flourish it was desirable that the Nile should rise about eight meters [26 feet] above a zero point at the first cataract near Aswan. A rise of only seven meters [23 feet] would produce a lean year, while six meters [20 feet] would lead to famine."[81]

There was, however, another factor that required careful observation: the heliacal rising of Sirius, which also occurred around the time of the summer solstice.[*61]

The ancient astronomer-priests paid avid attention to the celestial events that took place at dawn at this important time of year, and they waited for the heliacal rising of Sirius. We get a glimpse of the importance of this event—the conjunction of the summer solstice, the heliacal rising of Sirius and the summer solstice—in some passages of the Pyramid Texts.

> The reed-floats of the sky are set in place for sungod *Ra* that he may cross on them to the horizon; the reed-floats are set in place for *Horakhti* that he may cross on them to *Ra;* the reed-floats of the sky are set in place for me that I may cross on them to *Ra;* the reed-floats are set in place for me that I may cross on them to *Horakhti* and to *Ra.* The Fields of Rushes are filled [with water] and I ferry across on the Winding Waterway; I [the Osiris-king] am ferried over to the eastern side of the horizon, I am ferried over to the eastern side of the sky, my sister is Sothis [Sirius] . . . [82]

> The king will be the companion of *Horakhti* and the king's hand will be held in the sky among the followers of the Sun god *Ra.* The fields are content, the irrigation ditches are flooded for this king today . . . receive this pure water of yours which issues from Elephantine . . . O King, your cool water is the Great Flood . . .[83]

> The reed-floats of the sky are set in place for me that I may cross to the horizon, to *Ra* and to *Horakhti.* The nurse-canal is open, and the Winding Waterway is flooded, that I may be ferried over to the eastern side of the sky, to the place where the gods were born . . .[84]

The above quotes clearly show the conjunction of the start of the Nile's flood and the appearance of Sothis (Sirius). Although the summer solstice is not specifically mentioned, it is definitely implied, because, of course, both the "birth" (rising) of Sirius and the start of the flood occurred at that time of year when the sun rose to its extreme northern position. Another passage in the Pyramid Texts does imply this by having the departed king say: "I ferry across [the river Nile] that I may stand on the eastern side of the sky when the Sungod Ra is in his northern region . . .[85]

With all this textual, astronomical, and archaeological evidence, we must include the Shemsu-Hor, Those Who Followed the Sun—those ancestral kings—as being the people who followed the direction of the summer solstice sunrise in 3200 BCE . . . namely the prehistoric Black people of Nabta Playa (see chapter 5). Further, it could also be the Shemsu-Hor who brought with them an astronomical plan drawn on a leather roll, which was used for the layout of the temple of the cow goddess Hathor. In spite of the obstinacy of Egyptologists who continue to see the Shemsu-Hor as

mythical kings, the British Egyptologist Henri Frankfort says this of the Shemsu-Hor:

> The designation [Shemsu-Hor/Followers of Horus] was reserved for rulers of the distant past. The texts leave no doubt that the term referred to earlier kings. An inscription of a king Ranofer, just before the Middle Kingdom, contains the phrase "in the time of your forefathers, the kings, Followers of Horus [Shemsu-Hor]." Texts of Tuthmosis I and Tuthmosis III refer to them in the same manner. The first mentions fame the like of which was not "seen in the annals of the ancestors since the Followers of Horus"; the other states that, in rebuilding a temple, an old plan was used and proceeds: "The great plan was found in Denderah in old delineations written upon leather of animal skin of the time of the Followers of Horus." From these quotations it appears that "Followers of Horus" is a vague designation for the kings of a distant past. Hence the Turin Papyrus places them before the first historical king . . .[86]

From the Turin Papyrus we can work out that the Shemsu-Hor ruled for 13,420 years before the first historical pharaoh, who was identified as Menes. Egyptologists place the reign of Menes about 3000 BCE. This means that the start of the Shemsu-Hor lineage was about 16,420 BCE—which can be rounded to 16,500 BCE. Could it be a coincidence that this very date of 16,500 BCE is found in the astronomy of the Calendar Circle at Nabta Playa, as we have seen in chapter 4?[87]

We now return to the alleged plans for the temple of the cow goddess Hathor at Dendera and the claim that the temple's original plans were from the time of the Shemsu-Hor. If we assume that the original plans were from Nabta Playa, then we would expect to find the same kind of astronomy at Dendera that was dominant at Nabta Playa. This, unquestionably, is the astronomy defined by the focal point of the ceremonial complex at Nabta Playa, CSA, which contained the cow stone. We recall that from CSA there emanate a series of megalithic lines toward the star Dubhe in the north and a series of lines toward the east, directed toward the rising of Sirius.

Could the same be found at Dendera?

HATHOR, ISIS, THE BIG DIPPER, AND SIRIUS

The entrance to the temple of the cow goddess Hathor at Dendera faces north. The huge gate is flanked by six imposing columns whose four sided capitals are decorated with faces of Hathor, here a woman's face with cow's ears. Beyond the entrance is the hypostyle hall with a further eighteen similar columns, thus equaling a total of twenty-four columns. The whole temple is a maze of rooms, chapels, corridors, underground crypts, and stairs leading to the roof. On the roof, in one of the chapels, was found the famous Zodiac of Dendera, which we encountered in chapter 1, and which is now at the Louvre Museum in Paris.[88]

The Zodiac of Dendera

The main Hathor temple is famous for having housed the so-called round Zodiac of Dendera (as well as a lesser known rectangular zodiac located on the ceiling of the first hypostyle hall). The round Zodiac is really more a *planisphere,* or sky map, that shows the whole celestial landscape from the perspective of having the north celestial pole near its center. The actual zodiac, which was fixed on the ceiling of a chapel on the upper floor of the temple, is made from the twelve familiar Babylonian-Greek astrological signs, which are scattered in a rough loop around the celestial pole. In a larger loop are scattered the thirty-six decans of ancient Egypt, which were used for timekeeping and rebirth rites (because they contain Orion and Sirius). It is worth reminding ourselves that the decans were known from at least the pyramid age, which suggests that the Dendera planisphere has incorporated elements of great antiquity. Here, Orion-Osiris is represented by a striding man who wears the royal crown, and Sirius-Isis is shown as a recumbent cow with a five-pointed star above her horns. Interestingly, behind the Isis-Sirius cow is the figure of a woman holding a bow and arrow, almost certainly Satis of Elephantine, whom, as we have already seen, was also identified with Sirius (particularly with its heliacal rising and the Nile flood). Very near the center of the zodiac is the figure of a small jackal on what looks like a hoe. To its left is a large standing hippopotamus that represents the constellation Draconis, and to its right is the familiar bull's thigh that represents the Big Dipper. These last two constellations, as we have already seen, can be traced back to the pyramid age, again giving the Dendera planisphere links to the distant past.

The rounded planisphere that is seen today at Dendera is not the original one but a facsimile made in the 1920s. The original was taken to France after the Napoleonic invasion of Egypt in 1798, and it is now displayed at the Louvre Museum in Paris. Books and articles abound on the meaning and date of the planisphere of Dendera. It is well outside the scope of this investigation to review them all, but there is little doubt that the planisphere dates from the time when the temple was built—circa 54 BCE . It is much less clear whether the planisphere represents the sky at that time or, as some have suggested, a much older sky. In other words, we may wonder if the Dendera planisphere is a copy of a much older one on which was incorporated the Babylonian-Greek astrological signs. If this is the case, then there is no question that this artifact is a symbol of the precession of the equinoxes, which sees the astrological signs transit the east-west axis of the planisphere in a neverending cycle of twenty-six thousand years. The first scholar to suggest that this indeed was the case was the French astronomer Jean-Batiste Biot, who argued that a careful study of the position of the constellations and planets on the Dendera planisphere indicates a much older sky and, by extension, knowledge of the precession. Such ideas are usually vehemently rejected by Egyptologists and historians of science. Outside the temple on its west side

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Outside the temple on its west side are a series of *mammisi,* or "birth houses," built in Roman times. And farther still along the west side of the temple is a deep, artificial sacred lake, which is now dry and has palm trees growing in it. At the back of the temple is a small chapel known as the Birth Place of Isis, sometimes also called the temple of Isis.

This temple of Isis has its outer area aligned toward the east and its inner area aligned toward the north and parallel to the axis of the main temple of Hathor. The distinct impression it conveys is that observations toward east and north were carried out simultaneously. An inscription at the temple reads: "She [the star of Isis—that is, Sirius] shines into her temple on New Year's Day, and she mingles her light with that of her Father Ra on the horizon."[89]

This inscription clearly refers to the heliacal rising of Sirius.[90] Yet we have seen how the conjunction of the heliacal rising of Sirius with New Year's Day can take place only at the start of a Sothic cycle. With this in mind, the astronomer Edwin Krupp pointed out, "some traditions preserved at Dendera are thousands of years old,"[91] and he goes on to say that the inscriptions "describe metaphorically the heliacal rising of Sirius . . . certainly this astronomical event was watched from the roof of Dendera temple . . ."[92]

The British astronomer Sir Norman Lockyer[*62] first noted that the axis of the temple of Isis at Dendera had an azimuth of 108 degrees 30 minutes, which corresponded to the azimuth of Sirius when the temple was constructed, circa 54 BCE.[93]

Thus Lockyer concluded correctly, "the temple of Isis at Dendera was built to watch it [Sirius]." [94] On the other hand, inscriptions at Dendera confirm that the axis of the main temple of Hathor was aligned northward, toward the Big Dipper, using the traditional stretching the cord ceremony. Lockyer determined that it was aligned 18 degrees 30 minutes east of north. According to Lockyer, the temple was aligned to the star Dubhe in the Big Dipper.[*63]

It seems clear that the axes of both temples—that of Hathor and of Isis—were aligned simultaneously, the latter toward Dubhe in the north and the former toward Sirius in the east. Inscriptions at Dendera suggest this simultaneous sighting and, furthermore, that the observations were made at dawn.

Figure 6.5. Cow head, probably Hathor, on the so-called Narmer Palette, first dynasty circa 3000 BCE

[East alignment toward Sirius]: The great goddess Seshat brings the writings that relate to your rising, O Hathor [as Sirius], and to the rising of Ra [the sun at dawn] . . .[95]

[North alignment toward Dubhe]: The king joyously stretches the cord, having cast his gaze towards the Big Dipper [*Meskhetiu*] and thus establishes the temple in the manner of ancient times.[96]

So disdainful are most Egyptologists at possible astronomical alignments of temples and pyramids that one senior Egyptologist, Cathleen A. Keller of UCLA, even openly admits that "sometimes I think that the more resistant Egyptologists are more afraid that connections *do* exist between the orientation and plans of Egyptian temples and the heavens, than they do not."[97]

The fact is that no Egyptologists approved of Sir Lockyer's finding at Dendera, at least not until nearly an entire century later. In 1992 the French Egyptologist Sylvie Cauville, who is well-known for her extensive work on the inscriptions of Dendera, undertook a detailed study of the astronomical orientation of the temple of Isis.[98] She, too, felt that its alignments had been greatly ignored and that no one had given much currency to the findings of Lockyer. Cauville boldly solicited the collaboration of an astronomer, Professor Eric Aubourg, to examine again the orientations at Dendera, especially those at the temple of Isis.

As we see it today, the temple of Isis was erected in 30 BCE under the directive of the Roman emperor Augustus (Octavian) Caesar. It was built over the foundations of a much older temple, which are clearly visible even now. Recent excavations by the French team showed that there had been several interventions at vastly different epochs. In the foundations of the Roman temple, blocks belonging to the penultimate native pharaoh, Nectanebo I (ca. 350 BCE), were found. In addition, it would appear that the Ptolemaic kings Ptolemy VI Philometor (ca. 150 BCE) and Ptolemy X Alexander I (ca. 20 BCE) had carried out innovations here. More intriguingly, Cauville discovered reused stone blocks from the Ramesside period (ca. 1250 BCE), which bore the name of Prince Kha-emouaset, a son of Ramses II. Aubourg calculated that the azimuth of the Roman temple built in 30 BCE was 108 degrees 40 minutes, which matched the azimuth of Sirius. He then determined the azimuth of the lower temple to be 111 degrees 11 minutes, which corresponded to the orientation of the rising of Sirius in the epoch of Ramses II, about 1250 BCE. Here again, exactly as at the Satis temple at Elephantine and the Thoth Hill temple in Thebes, the ancient surveyors had responded to the effect of precession on the star Sirius by changing the orientation of the axes accordingly—very much as their ancestors had done at Nabta Playa several millennia before.

THE SUN TEMPLES OF THE SUN KINGS

In the fourth dynasty, immediately after the reign of King Khufu, builder of the Great Pyramid, there seems to have been a sudden shift in religious ideologies. For reasons that have not yet been properly understood, a new solar cult seems to have been introduced to the pyramid builders. This seems to have happened in the reign of King Djedefre, a son of Khufu. For example, Khufu's immediate sucessors, Djedefre, Khafra, and Menkaure, incorporated the name of the sun god Re (or Ra) into their names. They also took on the title Son of Re. Indeed, according to Egyptologist Mark Lehner, "Djedefre is the first pharaoh to take the title 'Son of Re.'"[99]

Djedefre chose a promontory some 8 kilometers (5 miles) northwest of the Giza pyramids to build his own pyramid complex in a region known today as Abu Ruwash. No adequate explanation was given by any of his contemporaries as to why this king chose to move so far away from Giza. Not even Djedefre himself explained. Being thus at a loss for a good explanation, Egyptologists have invented a reason: they theorize that there was a family feud—that Djedefre quarreled with his father, Khufu, and was banished from Giza, thus inducing him to build his own complex at Abu Ruwash.[*64]

Needless to say, there is not one shred of textual evidence to support this theory. With Carlo Bergmann's recent discovery in 1999 of Djedefre Water Mountain in the Sahara, however, a new theory backed by evidence can now be proposed. An observer at Abu Ruwash who looked east at sunrise at the summer solstice would have witnessed the sun rising directly over the sun temple of Heliopolis,[†65] a fact that can hardly be a coincidence in view of the circumstances surrounding Djedefre and the solar ideologies introduced in his reign. We can recall that the summer solstice marked the birth of Re, when the civil calendar was inaugurated, and could be a reason why Djedefre chose the title Son of Re.

We also now know, thanks to Carlo Bergmann, that during Djedefre's reign an expedition was sent into the deep Sahara and reached at least 80 kilometers (50 miles) south of Dakhla oasis and that the name of Djedefre is found inscribed on a mound now called Djedefre Water Mountain (DWM). We can recall from chapter 4 that when we witnessed the sunrise at DWM in April 2008, we noted that the mound was facing east, directly toward another flat-

topped mound whose midpoint and ends marked the two solstices and the two equinoxes. The midpoint also had a small depression that seemed to have been cut by human hands, so that when the sun filled the depressed space, it formed the hieroglyphic sign "sun disk between two peaks" , which stood for "horizon" and "sunrise." Yet we are aware that this sign was not known before Djedefre's reign, but instead appeared in the fifth dynasty, which immediately followed his own.

All Egyptologists agree that the fifth dynasty was intensely solar and had a very special connection to the sun temple at Heliopolis and its high priest. In the so-called Westcar Papyrus there is a story that tells us how a priestess named Rudjdjedet, the wife of the high priest of Heliopolis, gave birth to male triplets, whom she claimed had been conceived by the sun god Re himself.[100] All three were destined to become kings. Two of them, Sahure and Neferikare, incorporated the name Re into their own, and the third, Userkaf, made the unprecedented decision of commissioning a sun temple for himself, which was modeled on the great sun temple of Re at Heliopolis.[101] Five other sun kings that followed him also built for themselves sun temples near Userkaf 's, at a place called Abu Ghorab.[*66] [102]

So far, only two of the six sun temples—Userkaf 's and Niussere's—have been found. The other four are known only by their names on contemporary inscriptions. The six are: The Stronghold of Re, The Offering Fields of Re, The Favorite Place of Re, The Offering Table of Re, The Delight of Re, and The Horizon of Re.

The Sun Temple and Heliopolis

The connection of these temples to the sun god of Heliopolis was not merely spiritual, according to a new theory by British Egyptologist David Jeffreys about the exact location where they were placed relative to Heliopolis. In the 1990s, David Jeffreys conducted a survey in the area of Memphis on behalf of the Egypt Exploration Society. He noted that from the vantage point of the sun temples of Userkaf and Neussera, he had an unobstructed line of sight to Heliopolis, but if he moved just a bit farther south toward the Abusir pyramids, his view was cut off by the Muqattam hills. The sun temples were built some distance north of their corresponding pyramids in order to have a direct line of sight toward Heliopolis. "A re-examination of the location of Pyramids whose owners claim or display a special association with the solar cult betrays a cluster pattern for which a political and religious explanation suggests itself. . . . The Giza pyramids could also be seen from Heliopolis. . . . It is therefore appropriate to ask, in a landscape as prospect-dominated as the Nile Valley, which sites and monuments were mutually visible and whether their respective locations, horizons and vistas are owed to something more than mere coincidence."[103]

Could it be that the discovery of the Water Mountain in the Sahara by Djedefre was the underlying cause that brought about the new solar religion to the pharaohs? Was this a natural temple in the desert, which was behind the design of artificial temples at Abu Ruwash and Abusir? We can recall that on DWM there was also found prehistoric artwork next to the Egyptian hieroglyphic inscription of Djedefre's expedition. Were a prehistoric people still occupying the area when Djedefre's expedition arrived in around 2500 BCE? Were they the same people that also occupied Nabta Playa—the Black star people or cattle people that we encountered throughout the Egyptian Sahara, those followers of the sun and the star Sirius?

On the east face of Djedefre Water Mountain is a most telling inscription or, more specifically, a strange glyph that now, with all that we know of these very ancient star and cattle people, we can easily decipher. The glyph is composed of three rows of signs. The top row shows a five-pointed star, a cow's head, and a rope with a shape reminiscent of an ankh sign. The middle row depicts a flat plate with four lines extending vertically below it. The bottom row shows the same flat sign but with only one line extending down crookedly, and with two prongs at its end and, on each side, zigzagging lines.

All the signs are recognizable Egyptian hieroglyphs.[104]

N14 = star (*sba*)

F5 = wisdom, knowledge

V7 = rope (*shen*)

N4 = sky (*pet*) and rain (?)

N2 = lighting from the sky?

The two other glyphs in the bottom row, a lightining bolt and a human figure running or jumping, probably imply a rain-dance or storm-dance ritual.

Perhaps the entire glyph could thus read: "the star of wisdom which heralds in the rainy season/monsoon is greeted with joy." Perhaps Djedefre Water Mountain was a sort of natural sun temple to mark the summer solstice, and perhaps the star people or cattle people told the Egyptians of their knowledge and tradition, which linked the summer solstice, the monsoon, and the heliacal rising of the star Sirius.

There are so many water signs on Djedefre Water Mountain that we must recall heavy downpours (the monsoons). Yet climatologists are adamant that the monsoons stopped coming this far north around 5000 BCE—but how else could the Egyptians have known of these heavy downpours if not from a people who had actually experienced them? Further, could these people have traveled such a vast distance—from Nabta Playa to Djedefre Water Mountain, which, as the crow flies, is 360 kilometers (224 miles)?

In chapter 2 we briefly saw that in 2006 the Sahara anthropologists Stefan Kröpelin and Rudolph Kuper discovered another water mountain located 700 kilometers (435 miles) south of Nabta Playa, within Sudan, just west of a place called Dongola. The water mountain, which Kröpelin and Kuper described as a rock shelter, very much resembles Djedefre Water Mountain. Kröpelin and Kuper called the location Gala El Sheikh, and apparently it will soon be part of a protected national park. Also found were many petroglyphs—and, amazingly, there was the same water emblem as the one found by Bergmann at Djedefre Water Mountain (the slightly bulging rectangle with two peaks and within it zigzag lines).[105]

Unlike Bergmann's site, however, at Gala El Sheikh there were no ancient Egyptian hieroglyphs or drawings, suggesting that not only was the site of prehistoric origin but also that the people who once occupied this place had cultural connections to those who once occupied the region near Dakhla oasis. If this was so, then both were clearly also connected to the Nabta Playa people, for that site lies directly in the middle of a trail that could have joined Gala El Sheikh and Djedefre Water Mountain. As Carlo Bergmann strongly suspected about these mysterious water emblems, a thorough study of them, as well as further explorations in the Egyptian Sahara and along the possible trail that leads to northwest Chad and the Ennedi Mountains, may prove that a vast network of communication existed in prehistoric times among Black sub-Saharan Africans, and this eventually led them to migrate into the Nile Valley, where they, with their millennia-old knowledge of astronomy, husbandry, and even perhaps basic writing and a religious system, hastened the civilization that we call Egyptian. Much work remains to be done, but the evidence is convincing that the pharaohs were the descendants of these Black prehistoric people from the Egyptian Sahara, and that the pharaohs knew about these people even in early dynastic times.

For more than twenty-five years we have been on the quest for the origins of the ancient Egyptian civilization, yet we never suspected that it would be such a thrilling and rewarding intellectual adventure. We have tried our very best to pass the barrage of entrenched interests and to tell the general public of the many scattered clues that we have found in the alignments of pyramids and temples, all of which have led us to piece together a giant historical puzzle. Slowly but surely a completely new picture of our past emerges, revealing a lost and forgotten world, which extended from the Nile to the borders of Sudan and Chad and which told a very different story of the origins of ancient Egypt—a tale much more thrilling than that which any Egyptologist or anthropologist had previously led us to believe. We now can look with even greater awe at the wonderful legacy of ancient Egypt—especially at those imposing pyramids and temples—and see in them a very ancient message that was written in the stars, a message that directed us to faraway places in the desert and to a time when hardy and intelligent black-skinned men planted a seed that grew in the Nile Valley to give rise to a wonderful civilization. We know that from now on Egypt will never be the same for us, for when a Black Nubian or African passes us by, we will see in him or her, as surely as we see in ourselves, the reflection of a common Black genesis.

POSTSCRIPT

DISCOVERY OF THE KIFAH CAVE

On November 26, 2010, while this book was receiving the final editing at our publisher, we got news from Mark Borda (the Maltese desert explorer who back in 2007 had found the hieroglyphic inscriptions at Jebel Uwainat) that he had just returned from one of his daring solo expeditions in the Sahara and had made a new and stunning discovery, this time at Jebel Arkenu, the "sister-mountain" of Jebel Uwainat (located within the Libyan border some 50 kilometers northwest of Uwainat): *a massive prehistoric rock-art site, perhaps the largest known in Libya!*

The reader will note that the main events discussed in our book occurred in the vast eastern segment of the Sahara Desert known as the Libyan Desert. The area is bounded on the west by various mountain ranges that extend down the center of Libya, in the east by the River Nile, in the north by the Mediterranean Sea, and in the south by the Tibesti and Ennedi mountains. Measuring some 1,100,000 square kilometers, this area is ten times dryer than the rest of the Sahara and is the world's largest hyper arid hot desert. Harsh, inhospitable, and waterless, its dune belts, sand sheets, bare rocky plateaus, and mountains are almost completely void of life of any kind, and the little of it that exists is mostly concentrated into a handful of oasis scattered throughout the region. The reader will also recall that in the early to mid-Holocene period (roughly ten to five thousand years ago) the picture was very different. The area was relatively moist with plants, wild animals, and human settlements in considerable abundance.

Today this vast area is teeming with prehistoric remains that date from this period. The Sahara has long been noted for its rock art, primarily in the more accessible and thus more explored Western Sahara. But in recent years a handful of modern-day explorers, equipped with GPS devices and satellite maps are now also penetrating the less accessible wastes of the Eastern Sahara. From their numerous discoveries over the past ten years it now appears that the area contains an immensely rich treasure trove of prehistoric paintings, engravings, and other archaeological remains, ranking it as one of the most important rock-art regions in the world. The distinctively different rock-art styles at the various sites, without the need for tedious and lengthy archaeological excavations, immediately impart a wealth of information about the distribution and movements of the ancient cultures that created them. The ever-growing inventory of sites is gradually building up a map that is revealing the geographical extent of the areas occupied in various ages. It is hoped that more detailed scientific investigation of the rock-art sites will eventually establish the chronological movements of the various groups of people as their populations expanded, contracted, mixed, and migrated, and thus providing a clearer picture of why, how, and when these mysterious desert people impacted the area of the Nile Valley and the later Pharaonic civilization. These discoveries, therefore, have a direct bearing on the various themes discussed in our book.

The "Kifah Cave" is a most dramatic and impressive example of these ongoing recent discoveries and was found by Borda in a previously unexplored area of Mount Arkenu. Mr. Borda, who, as we have seen, had already impressed the archaeological world in 2007 by finding Pharaonic hieroglyphs at Jebel Uwainat, the "sister mountain" of Arkenu, found the cave on the morning of November 13, 2010, while exploring the chasms and spires of the much broken sandstone plateau that straddles the northeast of Arkenu. The cave, which is 28 meters wide and only a little more than a meter high at the opening, has the appearance of a horizontal slit sitting atop a series of ledges at the base of a cliff face. The Kifah cave is the most conspicuous of a group of shelters that attracted Borda's attention from a considerable distance. Being on the highest part of the ridge, where the shelters are located, the Kifah site was one of the last he inspected. The shelters lower down had proved to contain some rock paintings but in spite of the large size of these shelters, as well as the good headroom, light conditions, and ideal and ample rock surfaces on the ceiling, the rock art there consisted only of three cows and a single human figure. Based on this, Borda did not hold much expectations of finding anything more substantial as he proceeded farther up the ridge. When he got onto the final ledge, he could see from a distance of about 20 meters many dark markings on the ceiling of the cave, and within a few moments he was stunned to note that across its entire width, the shelter was filled with painted rock art! His immediate reaction was one of astonishment at the existence of such a large site at Arkenu, mixed with wonderment at the quality and details of the paintings he was seeing!

Borda describes the paintings in the Kifah cave as being from "the Uweinat Pastoralist period." It is concentrated in the front ceiling area of the cave to a depth of around 4 meters, yielding a continuous painted area of roughly 100 square meters, which makes it one of the largest, if not the largest, rock-art shelter in Libya. The evenness of the ceiling and the unbroken progression of paintings give the impression of a single vast mural. The many hundreds of motifs mainly portray cattle, goats, and other animals such as giraffes (see image of an aardvark on p. 277). Hundreds of humans are

also depicted in many different types of scenes such as hunting, herding, domestic, ritual, and so forth (see plates 23 and 24). The fine state of preservation of the images reveals many interesting details about adornment, shoes, clothing, implements, weapons, homes, furnishings, and items used by the prehistoric people. Although the cave extends inward about 8 meters, the deeper reaches are not painted, probably because the ceiling there is too low and dark. Mr. Borda plans to return to the site with a professional photographer to make a composite high-resolution digital montage of the entire painted rock ceiling. A pictorial article will then appear in the *SAHARA* journal in the middle of 2011. Mr. Borda wished us to also note that Kifah is the name of the first daughter of the Tuareg Salem Ben Yahya, one of Libya's most renowned desert guides, who Borda has traveled with on several of his expeditions. A day before Borda found the cave, Ben Yahya greeted Borda with the words "your mother was praying you" instead of the usual "good morning." Ben Yahya then promptly showed Borda a five-inch yellow scorpion that had scurried out from under Borda's mattress while Ben Yahya was gathering up the sleeping gear. The species is known as the Death Stalker (*Leiurus quinquestriatus*). Ben Yahya then related the harrowing story of how, at the tender age of just three months, Kifah was killed in the oasis of Rebbiana after the same species of yellow scorpion had crept into her bed while she slept. With the tragic story still ringing in his ears when he found the cave, Borda was moved to dedicate his discovery to the memory of Kifah.

A rock painting of an aardvark

We wish to thank Mark Borda for kindly allowing us to report this discovery and also for providing us with some photographs, which he took at the time of the discovery. Mr. Borda has been exploring the Libyan Desert since 2005, his main objective being to seek out possible remains of ancient Egyptian presence in its vast wastes and beyond. Apart from the discovery mentioned above, he has made a number of significant discoveries. We were among the first to visit one of these in 2008, a site that is now rather dryly referred to in the archaeological world as CC21, but which we prefer to call the "Borda Cave" in this book. It is unusually located between Gilf Kebir and Jebel Uwainat, an area previously thought to be devoid of rock art. The cave contains magnificent prehistoric rock paintings, now considered to be one the very finest and best preserved prehistoric rock-art sites of Egypt. Also the now famous "Uwainat Inscriptions" that Borda found in the southern part of Jebel Uwainat proved that the ancient Egyptians of the early Middle Kingdom (ca. 2000 BCE) somehow managed to travel the vast distance from the Nile across the totally arid desert without camels to meet the mysterious "people of Yam and Tekhebet," yet unidentified kingdoms perhaps located in the once fertile sub-Saharan regions of Africa.

Thomas Brophy (left) and Robert Bauval at the Uwainat Inscriptions, April 2008

APPENDIX 1

BACK TO THE FIRST TIME

Vega, Sirius, and Orion Agree at Giza

One day our descendants will think it incredible that we paid so much attention to things like the amount of melanin in our skin or the shape of our eyes or our gender instead of the unique identities of each of us as complex human beings.

FRANKLIN THOMAS

I refuse to accept the view that mankind is so tragically bound to the starless midnight of racism and war that the bright daybreak of peace and brotherhood can never become a reality. I believe that unarmed truth and unconditional love will have the final word.

MARTIN LUTHER KING JR.

In the main chapters of this book we have seen that there is a connection between the astroceremonial culture of the people of the Nabta region in Late Neolithic times and the earliest protodynastic and dynastic Nile astrosymbolism. The tracking of the rising of Sirius with the stars of the circumpolar Bull's Thigh constellation leads directly from Nabta to the Nile, as does attention to the motion of Orion's belt. Here, in more detail, is the evidence for continuous astroceremonial culture in the other direction, back in time to the Middle Neolithic[*67] and perhaps earlier. We can now trace the astroceremonial evidence back before 5000 BCE.

So far, in this journey back in astroceremonial time, we have the Sirius-plus–Bull's Thigh–Alkaid megalithic alignment of 6100 BCE and alignments to the vernal equinox heliacal risings of Orion's belt stars plus the autumnal equinox heliacal rising of Vega—and all are within a few hundred years of that same epoch. In addition, the Calendar Circle Orion's belt observing feature stretches back to about 6300 BCE—and the Calendar Circle suggests a method for imagining the entire precession cycle of the sky. The circle draws our attention to two time periods—circa 5000 BCE and, half a precession cycle before this, circa 16,500 BCE. That cycle brackets the time circa 12,000 BCE, which was the era referred to by the ancient Egyptians as Zep Tepi, or the First Time. The pyramids at Giza refer back to that time via their reflection of the Orion's belt stars in the layout of the Giza monuments. In terms of the precession cycle of a star, if Zep Tepi is the First Time, it is logical that it refers to the culmination time of the star when it is either farthest south or farthest north on its twenty-six-thousand-year cycle. Nabta seems to have been built during the half time or middle time to the Zep Tepi cycle or the precession cycle and also reflects representations from the sky of the earlier time as well as the time when Nabta was built. (Thus if Giza is the place of the First Time, Nabta may be the place of the center of time.) If there is a symbolic connection between Nabta and Giza, it may be possible to find more representation of the First Time at Giza by digging deeper into the findings at Nabta, which might tell us what to look for at Giza.

VEGA AND THE SUBTERRANEAN PASSAGE

As we have seen, the primary stars that were tracked ceremonially at Nabta are Sirius, the stars of Orion' belt, and the circumpolar stars, including Vega (Alpha Lyrae), which is a very bright star. At visual brightness magnitude 0.0, Vega, since Hellenistic times, defined the brightest portion of the stellar brightness scale. It is essentially equal to the variable star Arcturus as the brightest star in the Northern Hemisphere.[*68] Further, it is by far the brightest star that is ever near the long-term path of the celestial pole, and so for several centuries around 12,000 BCE, Vega was the brightest North Star ever. In the Great Pyramid at Giza, the two internal chambers, the King's Chamber and the Queen's Chamber, are connected to shafts oriented up and out along the meridian, the north–south line in the sky. Though they were previously determined to be air shafts, a number of authors have discussed that they probably indicate stars. Today it is generally

accepted that the shafts were, in fact, associated with stars—and that specifically the King's Chamber southern shaft was oriented to Orion's belt and the Queen's Chamber southern shaft was oriented to Sirius during the fourth-dynasty era completion of the pyramid.

Yet the pyramid complex contains another major shaft that is oriented along the meridian: the subterranean passage that cuts in a straight line from the original entrance of the pyramid, down through the bottom courses of masonry on the north side of the pyramid, then deep under ground into the bedrock to the subterranean chamber beneath the center of the pyramid. This other major meridianal shaft of the pyramid has never been successfully associated with a star. The subterranean passage is 1.2 meters (about 4 feet) high and 1.04 meters (3.4 feet) wide and runs 105 meters (344 feet) down into the bedrock. It is surprisingly uniform and straight, descending at an angle of 26.52 degrees.[2] Given the latitude of the Great Pyramid, the subterranean passage points to a declination of 86.54 degrees in the sky, 3.46 degrees directly south of the celestial pole. It is precisely aligned over its entire length, "without deviating more than a centimeter in angle or orientation," as Mark Lehner puts it.[3] The meticulous pyramid surveyor Sir Flinders Petrie notes for $^{2}/_{5}$ of its length an even greater precision, requiring "readings to $^{1}/_{100}$ inch or to 1" [one arc second] on the longer distances."[4] It is one of the most astonishingly precise features of the whole Great Pyramid complex, which itself is a wonder of precision—and it points to the sky, for what could be more of an intended orientation than a star? The passage is cut so consistently straight, and other aspects of the Great Pyramid, such as its cardinal orientation, are so accurate that it is likely that whoever cut the subterranean passage probably did not intend it to align with the celestial North Pole, because if that were indeed the target, it surely would have been hit more accurately.

To what, then, could the subterranean passage have been oriented? Given Nabta's megalith alignments toward Vega, we decided to test Vega against the Giza subterranean passage. Employing the most recent measures for Vega's proper motion[5] into the long-term calculations for its motion in the sky, we see that Vega achieved its highest declination of 86.54 degrees around 12,070 BCE. Vega matched the subterranean passage not simply at some passing date, but exactly when the star was at its northern culmination, the closest it comes to the celestial pole in its twenty-six-thousand-year precession cycle. In addition, the precision with which Vega seems to have matched the center of the shaft is surprising. Given the height and length of the shaft, its viewing angle actually includes a range of declination angles from 86.22 degrees to 86.87 degrees, centered on 86.54 degrees, and Vega appears to have hit it directly in the middle,[*69] exactly at culmination. Therefore, if these calculations and measures for Vega prove to be accurate,[†70] Vega began shining down to the bottom of the subterranean passage around 12,320 BCE, when Vega's declination rose above 86.22 degrees, and around 12,070 BCE, Vega shone down the center of the shaft until ca. 11,820 BCE, when Vega sank below 86.22 degrees declination again and no longer shone to the bottom of the shaft.[‡71]

These Vega subterranean passage dates are consistent with the general Zep Tepi we can estimate from the fact that Orion's belt matches the layout of the three pyramids on the Giza plateau.[§72]

It is important that Sirius culminated at about the same time. In *The Egypt Code,* Bauval notes that around Zep Tepi, Sirius would have been just visible on the horizon, as seen from the Giza plateau. In light of this new information of the bright pole star, Vega, shining down the subterranean passage when it was at precessional culmination, we can now look in even more detail at the astrophysics of the Sirius connection. Again, employing the latest measures for Sirius's proper motion,[6] as we did for Vega, we see that Sirius reached its southern culmination around 12,280 BCE at a declination of -60.43 degrees. That declination is noteworthy because the declination of the geometric horizon at Giza looking south is -60.02 degrees, and the visual horizon is thus -60.5 degrees,[7] essentially identical to the southern culmination of Sirius. The Giza plateau, then, is the place on Earth (the only latitude) where Sirius, at the southernmost point of its twenty-six-thousand-year precession cycle, just barely eclipsed the earth.

Visual Horizon versus Geometric Horizon

The visual horizon is about 0.5 degrees lower than the geometric horizon, because the light from a star is bent when it passes through Earth's atmosphere. It is thus possible to see starlight from slightly below the geometric horizon. The precise amount of refraction depends on atmospheric temperature and humidity, but, generally, it averages a bit more than 0.5 degree.

TAKE A WALK AT THE FIRST TIME WITH SIRIUS

Sirius is so bright that it is the only star that can sometimes be seen during daylight, and under good conditions at night it can be seen even when the star is just barely above the visual horizon.[*73]

We can imagine that we are living in the region (that is now Egypt) around 12,250 BCE and are so highly attuned to the night sky that we are especially oriented to the brightest star of all, Sirius. It is the time of year that is near the summer solstice, and it is millennia before the monsoons move north to bring life again to the desert—we are near the life-sustaining waters of the Nile, but we are nomadic, moving north and south each year, following the best conditions for survival. We are traveling north for several days during a hot summer, and we travel about 55 kilometers (34 miles) per day—a long but feasible day's walk for a well-conditioned wanderer. This distance is half of one-degree latitude on Earth's surface. We are five days' walk south of the place that is now known as Giza. We are aware that the always-easyto-spot three-star asterism of Orion's belt will rise early evening in the far southeast, and it will culminate south, hanging in the sky at a low altitude of around 15 degrees two hours before midnight. We also know that just after Orion's belt transits the meridian to the south, at 110 minutes before midnight, Orion's trailing companion, the starry ruler of the night sky, Sirius, will crack the horizon just 12 degrees east of due south, and Sirius will skim the southern horizon at a very low arc, reaching an altitude of just more than 2 degrees before descending again below the horizon. We know that Sirius is so bright that if we have an unobstructed view of the south horizon, perhaps if we are on a low hill or sand dune in the desert, we will be able to view our old friend in the sky for a couple of hours around midnight. To the north, the brilliant Vega is always up, always visible whenever the sky is dark. Less than 3.5 degrees from the celestial pole in the north, Vega is a restless North Star that cycles up, down, and around the pole each night in a small circle that is 7 degrees across, and when Sirius is high, Vega is low, reaching the bottom part of its circle around the celestial North Pole at just more than an hour after Sirius reaches its height in the south.

As we trek farther north each day, the familiar starry show in the sky each night repeats itself, but Sirius skims the horizon on an even lower and shorter arc each night as we move north. By the time we arrive, a few days walk farther north, at the place now known as Giza, Sirius makes such a low, brief arc on the horizon that viewing it requires perfectly clear conditions, and we must stand on a platform to catch any glimpse of the star. In one more day's walk farther north it will be impossible to glimpse Sirius at all. The tracking of the star is a deeply ancient part of our ancestral lore and our annual life. During the days the angle of the sun in the sky informs us what time of year it is, and during nights, the appearance of Sirius tells us the same information. In this way, our ancestors have kept in tune with the seasons for a very long time. What's more, we know that in the region just a couple of days farther north, at the place we now know as Alexandria, we used to be able to glimpse Sirius only a few generations ago before it disappeared entirely from the night sky. Our ancestors have been studying the sky for so long that they were able to teach us how the sky changes over a very long time. Thus we know that Sirius will again return to the northern regions, and the brilliant Vega will move down, away from the celestial pole, and Sirius will climb higher again in the southern regions. That is why the place in which we are standing now is the place of the First Time, Zep Tepi: Giza.

DUAL DATING AND VEGA RECONFIRMED

The ancient name of the Great Pyramid at Giza, the name used by the ancient Egyptians, was Akhet Khufu, The Horizon of Khufu.[8] Is it possible that the sacred place where Khufu marshaled his kingdom to build the Great Pyramid was already known simply as Akhet, the Horizon, the place on Earth where the ruler of heaven, Sirius, briefly comes down exactly to the horizon every twenty-six thousand years? Khufu built his great pyramid on the Place of the Horizon in order to make it the Horizon of Khufu.[*74]

We have seen that the standard date for the building of the pyramids is the fourth dynasty, and we have seen that the layout of the pyramids that matches the stars of Orion's belt is an allusion to a distant past, a symbolic reference to Zep Tepi described in inscriptions. Similarly, the Calendar Circle at Nabta Playa was likely constructed and used circa 5000 BCE, and it teaches about much earlier times—actually, about the entire precession cycle. In light of our findings regarding the subterranean passage and Vega, and our more detailed study of the motion of Sirius, we must consider again the possibility that the pyramids at Giza were indeed built during the fourth dynasty but were built on top of a location where there was some preexisting, symbolic, much older architecture. Constructions at sacred sites around the

world, including those in ancient Egypt, have been built and rebuilt on locations of earlier constructions, often over millennia. Many people have suggested that the Giza plateau complex itself is one such site. Probably, the most stunning evidence for this has come from Boston University geologist Robert Schoch, who, together with inspiration from independent Egyptologist John Anthony West, measured the weathering of the Great Sphinx and the Sphinx enclosure. Schoch essentially proved that from a geophysical standpoint the Sphinx was weathered by long-term heavy rainfall and thus predates 5000 BCE. Schoch notes that we cannot determine precisely when the Sphinx was carved into the living bedrock, but rigorous geophysical analysis gives the epoch circa 5000 BCE as a minimum age.[9]

Like all things that challenge a reigning dogma in an academic field, Schoch's dating of the Sphinx has generated voluminous polemical argumentation, but he is well supported by the geophysical evidence. In the Sphinx, then, there is monumental architecture on the Giza plateau that predates the fourth dynasty by more than two millennia. Our study of the Vega and Sirius signatures suggests there was some symbolic architecture on the Giza plateau as far back as the actual Zep Tepi and that Giza is the place of Zep Tepi. It has long been suggested that the subterranean chamber at the end of the subterranean passage of the Great Pyramid appears to be much more ancient than the fourth dynasty. Schoch has also suggested that the central subterranean chamber of the Red Pyramid of fourth-dynasty founder Pharaoh Sneferu at Dashur shows geological weathering that is evidence of a much more ancient date.[10]

It's possible that the symbolic architecture existent at Zep Tepi included the subterranean passage down to the subterranean chamber, beneath a mound topped by a flat platform, possibly to the level where the Queen's Chamber exists today. Indeed the Great Pyramid is known to be built over a bedrock mound platform that is, in its interior, about 8 meters (26 feet) high and extends to approximately where the subterranean passage emerges from the bedrock.[11] In this view, the Great Pyramid was completed in the fourth dynasty on top of the then ancient subterranean passage and platform. The Zep Tepi platform was symbolically preserved in the completed architecture of the pyramid by the horizontal passage that leads to the Queen's Chamber. The horizontal passage basically has the same dimensions (1.2 meters—3.9 feet—in height) as the subterranean passage, and conceptually, the horizontal passage is another star shaft directed exactly along the horizon—symbolically preserving the much more ancient horizontal platform used to represent and probably to view Sirius at the First Time, Zep Tepi, and preserving the place on Earth that demarcates the parts of Earth from where Sirius never disappears and the parts of Earth where Sirius does disappear.

Further suggestive of symbolic unity is the ascending passage that now connects the subterranean passage and the horizontal passage of the Queen's Chamber. It is of the same dimensions (1.2 meters—3.9 feet—in height), and it is sloped upward at an almost identical angle to the downslope of the subterranean passage—much like a reflection off the horizon plane. If there was a Sirius platform at Zep Tepi and if the subterranean passage did exist, then it would have been possible for a single priest or priestess to view by employing a simple flat reflector or still pool of water where the subterranean passage enters the earth and connect the light of Vega from the north shining down the passage at the same time as the light of Sirius from the south just skimmed the horizon. Thus two great rulers of the starry sky—Sirius, the crown jewel of the night, and Vega, the ruler of all the circumpolar stars—were viewed and symbolized simultaneously at both of their twenty-six-thousand-year precessional culminations (with Sirius culminating south and Vega culminating north). Their precise culminations were 180 years apart, but for centuries they demonstrated simultaneous shining along the horizon platform and into the subterranean passage, and around 12,020 BCE their lights shone simultaneously and directly from the south and the north onto the place of the First Time. Significantly, this starry drama occurred around midnight, when the sky was dark, only on the days of the year around summer solstice. Further, the Great Pyramid and subterranean passage are located on the Giza plateau in such a way that the plateau slopes down and away to the southeast, giving an unobstructed view of the southern horizon in order to accommodate viewing the starry show.

Throughout ancient Egyptian history, the heliacal reappearance of Sirius marked the New Year as well as the imminent arrival of the Nile floods, much as the appearance of Sirius marked the New Year and the playa-filling monsoons at Nabta Playa. Monuments simultaneously marking the rising Sirius and the circumpolar stars represented the bounteous measure of the New Year cycle. We can see that at the place of the First Time, Zep Tepi, the start of the new Great Year of precessional motion of Sirius, ruler of the heavens, is monumentally indicated, together with the Great Year cycle of the celestial pole around the invariant point ruled by the greatest pole star of all, Vega. There is an elegant similarity in this use of stellar symbology (Sirius rising simultaneous with the circumpolar star) to mark both the annual cycle of the seasons and the Great Year cycle of the Ages.

At this point, traditional-minded archaeoastronomers would raise an objection that the Vega-to-subterranean passage alignment is only one star in one alignment and therefore is not significant. Yet we can now see that this single

alignment is part of a symbolic system repeated again and again, and that it occurs not simply in any time in the star's cycle, but at the special time of culmination. Still, objectors would say that other examples of the same alignment are needed for verification. To honor this, we can examine other subterranean passages.

Actually there are only two extensive subterranean passages associated with the six giant pyramids:[12] third-dynasty Djoser's step pyramid at Saqqara, fourth-dynastry founder Sneferu's Bent Pyramid and Red Pyramid at Dashur, the great pyramids of Khufu and Khafre at Giza, and the fourth-dynasty Unfinished Pyramid at Zawiyet el-Aryan. Besides Khufu's Great Pyramid, the other subterranean passage is beneath Sneferu's Bent Pyramid at Dashur. Located 21 kilometers (13 miles) south of the Great Pyramid of Khufu, the giant Bent Pyramid of Sneferu is at latitude 29.79 degrees. We learn from Egyptologist I. E. S. Edwards[13] that the subterranean passage of the Bent Pyramid starts at the entrance to the pyramid on its north face, about 12 meters (39 feet) above ground. It continues down through the masonry for 25 meters (82 feet), first at an angle of 28.36 degrees, and then shifts to an angle of 26.33 degrees before moving from the masonry down into the bedrock after another 48 meters (157 feet). The passage continues, precisely directed at a constant angle through the bedrock to a chamber under the center of the pyramid, and the entire subterranean length of the passage into the bedrock is at a constant angle of 26.33 degrees. This angle, combined with the latitude of the Bent Pyramid, points to a location in the sky with a precise declination of 86.54 degrees—identical to the subterranean passage of the Great Pyramid of Khufu at Giza. So if the subterranean passage that is now under the Bent Pyramid existed at Zep Tepi, plunging into the bedrock beneath a horizon-viewing platform on the surface, essentially the same starry drama as at Giza could have been observed at Dashur—with the only difference being that at Dashur, Sirius would rise to a slightly higher altitude by about 20 arc minutes.

The ancient name of the Bent Pyramid was the Southern Shining Pyramid.[14] Perhaps, when Sneferu marshaled his kingdom to build the Bent Pyramid, the location was already known and revered as the Southern Shining—the place on Earth, and especially south, where the ruler of the heavens, Sirius, shines eternally and never disappears beneath the horizon. Sneferu built three large pyramids. The first, at Meidum, bears an exalted personal ancient name: Sneferu Endures. The last, about 2 kilometers (1.2 miles) north of the Southern Shining Pyramid, had the ancient name of the Shining Pyramid. Sneferu's son, Khufu, built the pyramid called the Horizon of Khufu. The Bent Pyramid and its subterranean passage are also located topographically so that the distant southern horizon was nearly perfectly flat and unobscured.

The subterranean passage under the Bent Pyramid has not been surveyed as extensively and repeatedly as has the subterranean passage under the Khufu Great Pyramid, thus we don't know whether the Bent Pyramid passage may also be as precisely wrought as the Khufu Pyramid passage.[*75] We do know, however, from measuring the structures that the builders of both of these giant pyramid complexes were capable of and in fact implemented great precision over long distances. If it can be shown, then, that the only two subterranean passages under the two key true giant pyramids were oriented to the same declination in the sky with the same high precision, then that alone would contribute evidence that the builders indeed had astronomical intent—whether or not that intent was Vega. In light of these findings, perhaps another survey of this aspect of the Bent Pyramid could further illuminate the origins of these two subterranean passages.

We also note that the two other great pyramids on the Giza plateau, the Menkaure and Khafre pyramids, have shorter, less surgically precise subterranean passages that don't extend down all the way under the center of their structures. Menkaure's bedrock passage descends 31 meters (102 feet), about half of that length through the lower courses of masonry and the rest down into the bedrock at an angle of 26.03 degrees, and Khafre's passage descends a much shorter distance at an angle of 25.92 degrees. These yield declinations to the sky of about half of one degree lower than their Great Pyramid partner, and the broader angular spread of their openings means that they would have captured the light of the culminating Vega during the same times as did the passage under Khufu's pyramid.[*76]

Finally we must look at the dual nature of many aspects of the Bent Pyramid. First there is the bend in the slope of the pyramid itself. Further, the north descending entrance passage is bent, within the masonry of the lower part of the pyramid that is not bent, and the west entry passage is bent (from 30.15 degrees to 24.28 degrees), [15] also entirely within the lower courses of masonry that are not bent. Many Egyptologists believe that the Bent Pyramid was bent due to a series of accidents and poor planning of the construction, but there seems to be ample evidence that it was planned in its structure. As Schoch puts it:

> I suspect strongly that the Bent Pyramid was meant to be bent from the beginning. Unlike any other Egyptian pyramid, it expresses duality—two angles, two geometries, two tunnel and chamber complexes. There is something

ritualistic and symbolic in this shape, a meaning we now find elusive. The Egyptians clearly found this meaning to be important. The craftsmanship of the Bent Pyramid achieves a high level, and the entire structure is beautifully wrought. Clearly Sneferu and the Egyptians of his time were using architecture to express something of great importance, and they were giving this work their all.[16]

The Bent Pyramid is the first true giant pyramid created by the ancient Egyptians[†77] under the reign of Sneferu, the founder of the fourth dynasty. Evidence suggests that it was located on a site that included preexisting symbolic architecture, such as the Zep Tepi Vega shaft that was revered and extremely ancient even in the time of Sneferu. The duality symbolism repeatedly built into the Bent Pyramid may represent the dual times—Zep Tepi (the First Time), and the second time of the revival of monumental astroceremonial architecture in Sneferu's fourth dynasty. This dual astroceremonial architecture is also present at Giza and was present at Nabta Playa. We can note that these two monumentalized epochs—Zep Tepi and the initiation of giant pyramid complex construction in Old Kingdom times—also represent two stations of the Great Year cycle of the ages: the southern culmination of Sirius at summer solstice midnight and the heliacal reappearance of Sirius at summer solstice dawn.

We can note that when we find a new interpretation, one that will endure the test of time, for an ancient monument or set of monuments, there tends also to be found some bits of folklore, mythology, or story from the past, often ignored or dismissed by moderns, that points toward the same interpretation. Thus, once these alignments to Vega at Zep Tepi were determined, we searched the literature and indeed found that Manly P. Hall writes in 1928, "In the light of the secret philosophy of the Egyptian initiates, W. W. Harmon, by a series of extremely complicated yet exact mathematical calculations; determines that the first ceremonial of the Pyramid was performed 68,890 years ago on the occasion when the star Vega for the first time sent its ray down the descending passage into the pit."[17] W. W. Harmon, an esoteric Theosophist, seems to have claimed to have received somehow, from an ancient initiatory tradition, the basic idea of Vega shining down the subterranean passage as the first use of the Giza complex for ritual initiatory purposes. He then attempts to calculate a date on his own. It is interesting that he seems to have been correct about Vega and the subterranean passage but is completely wrong about the date. (Even going back to earlier precession cycles does not yield Harmon's date.) Quite opposite Harmon, we first suspected Vega for purely astronomical reasons based on calculations, then we researched the cultural and contextual evidence in order to find that an intended Vega alignment does indeed fit into the historic-cultural sequence.

There seems to be mounting evidence that there was some symbolic architecture at Giza and Dashur during Zep Tepi and that it referenced Vega and Sirius, because these stars represented the First Time, the beginning of the Great Year of precession. At this point defenders of the orthodox view may object along the traditional line of thinking that there was nothing at Giza before the Old Kingdom and that, therefore, it is not plausible that several millennia earlier there was monumental architecture. As Zahi Hawass, director of the Supreme Council of Antiquities, states, "But no single piece of material culture, not a single object nor piece of an object, has been found at Giza that can be interpreted as coming from a lost civilization [before the Egyptian Dynasties]."[18] The Great Sphinx, however, must qualify as a piece of material culture. Further, though the Sphinx may not have been in existence as far back as Zep Tepi, and perhaps it was, or is, only seven thousand years old, the minimum age required by geophysical weathering. In either case, the Sphinx is strong evidence that there was monumental symbolic architecture at Giza long before the pharaonic Old Kingdom times. In the orthodox view, of course, the physical evidence for the ancient Sphinx could be dismissed on the basis that it is an anomaly—the only piece of evidence—and, therefore, it doesn't count. The Vega shafts and Sirius platform Zep Tepi findings can also be dismissed by some as anomalies based on the fact that this evidence is astroceremonial, rather than proved by radiocarbon or other traditional dating methods. At some point, however, enough anomalies from enough different disciplines add up to an overwhelming body of evidence.[*78] [19]

So the developmental sequence may have been thus: The Black African star people of the Sahara developed the forerunner of the Egyptian civilization and, in the process, built the astroceremonial complex at Nabta Playa. When the extreme dryness of the region finally set in, they moved to the Nile Valley and developed the archaic temple of Satis at Elephantine Island. They then spread throughout the Nile Valley, assimilating the existing populations into dynastic Egypt and increasing their megalithic building activities. By the third dynasty, King Djoser, with his astronomer-priest Imhotep, built at Saqqara the first major monumental complex of dynastic Egypt. Then fourth-dynasty founder King Sneferu, and Sneferu's son, King Khufu, built the Bent Pyramid at Dashur, followed by the Great Pyramid at Giza, both constructed on top of much more ancient sacred subterranean passages and platforms from Zep Tepi. Thus, all the truly monumental pyramid architecture of the dynastic period (with the exception, perhaps, of the fourth-dynasty Unfinished

Pyramid at Zawiyet el-Aryan) is associated with Zep Tepi. The Great Sphinx at Giza already existed in some form and was probably modified by fourth-dynasty refurbishments. The Zep Tepi architecture was likely abandoned for a long time before the protodynastic and dynastic Egyptians arrived to build on it—or at least it was little used and clearly was not in a location of a major habitation or city.

The question then becomes: Can we draw a line back through time from the dynastic Egyptian architects to the Nabta Playa megalith builders and back even further to Zep Tepi builders? We can recall that circa 5000 BCE the Black African star people at Nabta Playa built their astroceremonial complex on top of a preexisting symbolic landscape carved onto the bedrock that they knew to be much more ancient. Further, when they moved to the Nile and up to Giza, they again built on top of much more ancient star monuments. All these constructions display a knowledge of the stars that would seem to have taken a very long time to develop. Surely the Nabta Playa star people who became the protodynastic ancient Egyptian builders were aware of and perhaps somehow connected to the more ancient Zep Tepi people. Perhaps they were the Shemsu Hor, who migrated from the Nile to the Sahara when the monsoons moved north and made the Sahara green, and it is their very distant progeny who we can track back through Nabta Playa to the Nile as the monsoons again moved south.

SOTHIC CYCLES AND ZEP TEPI

We must next consider how the calendar-based Sothic cycle from the Old Kingdom may relate to Zep Tepi. We can recall how 11,541 BCE would have been the start of a Sothic cycle if it was reached by measuring in increments of the 1,460-year calendar counting method, starting from the one recorded Sothic cycle end in 139 CE. Yet the precise interval between heliacal risings of Sirius, as with any star, varies somewhat if we consider it over an entire precession cycle. Around 12,000 BCE, when Sirius was very low on the southern horizon, the idea of heliacal rising at Giza was problematic, because Sirius didn't even reach the 1-degree altitude normally considered for heliacal reappearance. Simple geometry, however, shows us a very interesting fact: when Sirius was at its southern culmination it was highest in the sky at midnight on the day of summer solstice. At Giza, then, the place of Zep Tepi, the precise year around 12,000 BCE that marked the southern culmination of Sirius was by definition the heliacal rise of the entire Sirius precession cycle—the origin of the supercycle of all the cycles. Further, at essentially the same time the king of all North Stars, Vega, culminated shining down into the subterranean passage and the pattern of the three stars of Orion's belt matched perfectly the pattern of the three pyramids of Giza.

Another Way to Think of the Southern Culmination of a Star

Those inclined to think geometrically can easily visualize this: the southern culmination of a star, in this case Sirius, occurs when the south pole of Earth points as nearly toward the star as is possible during the twenty-six-thousand-year precession cycle. This orientation is similar to the Earth-to-sun orientation at winter solstice, which occurs every year. On the day of summer solstice, then, the sun and a south-culminating star (in this case, Sirius) are directly opposite each other relative to Earth. We can then imagine the sun shining on Earth and creating a shadow (nighttime) on the far side of the planet. Thus the south-culminating star is viewed at midnight on the day of summer solstice and on the meridian (due south, just at the horizon—in the case of Sirius, at Giza) at the darkest time of night. We can also see that in some sense the geometrical heliacal rising of a south-culminating star occurs at vernal equinox, because that is the day of the year when an observer on spinning Earth moves from dark into light, just as the south-culminating star is on the meridian, but in actual viewing conditions the sky is probably too bright to see the star at that moment.

EXACT DATE OF ZEP TEPI?

Astronomy in isolation can give precise dates, but we must make the cultural connection. In summary, the astronomically determined dates related to Zep Tepi are these: (1) the layout of the Great Pyramids at Giza, referring back to the centuries around 11,700 BCE; (2) the southern culmination of Sirius circa 12,280 BCE, marked by the location of the Giza monuments and the Queen's Chamber horizontal passage; and (3) Vega located as North Star at its northern culmination, in 12,070 BCE, marked by the subterranean passage of Khufu's Great Pyramid at Giza and Sneferu's Bent Pyramid at Dashur. Yet we may want to know what was the exact date of Zep Tepi. It's important to remember that Zep

Tepi is an astroceremonial concept: it is a combination of astronomical measurement and cultural-religious meaning. It is the origin of long-term human cultural cycles and is a calendrical origin to long-term astronomical cycles. Here we have hammered away at the purely astronomical parts of an exact date. The astronomy seems to point to Zep Tepi being in the era around 12,000 BCE. Further, the date is associated conceptually with the culminations of Sirius and Vega, which mark the starting point of the long-term precession cycle, or Great Year, of about twenty-six thousand years, and with Orion's belt,[*79] which provides the sky asterism for tracking that Great Year. If Zep Tepi did refer to a more specific date we must make more progress on understanding culturally the specific aspect of astronomy to which it was tied. We don't seem to have a complete answer at this time—but we have suggested some clues. Specifically, this cycle is what we also know as the cycle of Zodiac Ages and has also been correlated to the Vedic Yuga cycle, and both of those originated in the same general epoch.[20] Further, we have suggested that the northern culmination of the center of our galaxy, which visually is located in the Dark Rift in the Milky Way, occurs in the same epoch,[†80] may also be monumentally referenced, and can provide a less variable calibration point, because, unlike stars, it has no proper motion. We have seen that the Great Sphinx at Giza, gazing east to the rising sun in its namesake constellation, Leo, also comes from around the same epoch.[21]

As we have seen in chapter 6, British Egyptologist Rundle T. Clark concluded this about Zep Tepi: "[A]ll that was good or efficacious was established on the principles laid down in the 'First Time'—which was, therefore, a golden age of absolute perfection."[22] If the Vedic Yuga cycle is properly calibrated to the precession cycle in the same way, then we can conclude that Zep Tepi was coincident with the center of the Satya Yuga, which the Vedas identified as the perfect time or golden age of humanity. Here we trace the physical archaeological and astro-ceremonial evidence to identify that the ancients themselves placed that golden age in the epoch around 12,000 BCE. The question of whether there could be some mechanism that actually does connect the astrophysical cycle to the cultural development of humans is a subject beyond the scope of this book.

APPENDIX 2

SOTHIC CYCLES AND IMHOTEP'S CALENDAR WALL

The Sothic cycle is the duration of synchrony between a 365-day Egyptian civil calendar and the heliacal rising of Sirius. A difficulty with calculating this cycle lies in defining *heliacal rising*. The basic concept of heliacal rising is the day of the year on which Sirius first seems to reappear on the eastern horizon just before the sun rises. Obviously, it would be problematic if we were to apply this purely visual definition. If the weather happened to be cloudy or the sky was filled with dust, an otherwise viewable reappearance would be missed, perhaps for many days. A more sensible definition could be the day on which Sirius would be visible, if the viewing conditions were optimal, and *optimal* is defined as a specific angular relationship of sun, Sirius, and horizon.

In order to understand the Sothic cycle, we must first look at two related cycles. Today the length of the tropical year is 365.2422 days, so that a 365-day civil calendar would return the day of summer solstice to the same calendar date every 1,507.1 years. (We can call this the solstice-to-civil cycle.) Today the length of the sidereal year (with respect to the distant stars) is 365.2564 days, so that a 365-day calendar would return a star sign or zodiac constellation date to the same calendar date every 1,423.8 years. (We can call this the sidereal-to-civil cycle.) This difference between the sidereal-to-civil cycle of 1,423.8 years and the solstice-to-civil cycle of 1,507.1 years is due to the precession of Earth's pole, the precession of the equinox. If Earth did not precess, then the sidereal-to-civil cycle would be the same as the solstice-to-civil cycle. Further, those sidereal and solstice rates are as measured today, while the actual precession rate varies slightly over time, which means these cycle durations also vary. Because the heliacal rising is a combination of sidereal and solar measurements—essentially, a complex addition of the two—we would expect the Sothic cycle, to first approximation, to be the average of the sidereal and solstice cycles, which, given today's rates, would be 1,465.4 years. This is remarkably close to the purely calendar-based cycle of 1,460 years—the cycle between two types of civil calendar systems (one that adds a day every four years, like our leap year, and a fixed, 365-day calendar such as the Egyptian civil calendar).

Yet we would expect an actual Sothic cycle to vary from our rough estimate, due to several factors. First, the precession rate varies with time; the rate has been steadily increasing since roughly 8000 BCE. Today, the precession rate is about 50.29 arc seconds per year, while around 4000 BCE the rate was roughly 1 arc second per year slower. Due to this effect alone, almost half of one year would be added to the Sothic cycle over the span of about two Sothic cycles. A second factor is that the tropical year itself also changes over time—but this effect is orders of magnitude smaller. A third factor, more difficult to estimate but which has a greater effect, is due to the change in declination of the star and its drift in right ascension relative to the vernal point—the day relative to solstice moves steadily through the year so that the angular relationship of star to sun to horizon is altered.

Still, we can fairly easily use SkyMapPro to measure the Sothic cycles. First, we set the latitude to that of Djoser's step pyramid (29.871 degrees north) and we set the year to 2781 BCE and we set the day to summer solstice. The result is that on that day, when Sirius is at altitude 1 degree, the sun is at altitude -8.96 degrees 45 minutes before the center of the sun disk passes the horizon. This is clearly a good reference for heliacal rising, because Sirius is certainly bright enough to be seen briefly under such conditions. We call this summer solstice day, the first day of Thoth (1 Thoth) on the Egyptian civil calendar, and we note that SkyMapPro calls this day July 16, 2781 BCE. We make this the definition of Sirius heliacal rising—the day of the year when Sirius is at altitude 1 degree and the sun is simultaneously at altitude -8.96 degrees or lower. Next, we search for the previous year when Sirius rose heliacally on a first day of Thoth (1 Thoth) according to the Egyptian civil calendar. We know that SkyMapPro uses Julian years (365.25 days per year), so we note that what SkyMapPro calls July 16, 4241 BCE, is a first day of Thoth on the Egyptian civil calendar. When we look at that date, we see that when Sirius was at 1 degree altitude, the sun was at -9.41 degrees altitude just below the horizon, and the day before 1 Thoth, the sun was only -8.70 degrees below the horizon—less than our criterion of 8.96 degrees—so in that year the first day of Thoth was indeed the day of reappearance of Sirius.

We must remember, however, that a given date for heliacal rising of Sirius should persist for about four years in a row on the Egyptian civil calendar, so in order to nail down the exact Sothic cycle, we must check the following years. We see, then, that two years later, 4239 BCE, on the first day of Thoth with Sirius at altitude 1 degree, the sun was -9.05 degrees altitude, which still satisfies heliacal rising (and this time, eleven days before summer solstice). In later years, all the way up until 2781 BCE, the first day of Thoth was not the heliacal rising date. So this Sothic cycle extended from 4239 BCE to 2781 BCE (in Julian years), which is 1,459 Egyptian civil calendar years.

By a similar method, we find that the next first day of Thoth-Sirius heliacal rising was 1325 BCE (twelve days after

summer solstice) which is 1,457 Egyptian civil calendar years. These cycles agree with Ingham's calculations[1]—he calculated the cycles before and after 2769 BCE and came up with 1,458 and 1,456 Julian years, which equal 1,459 and 1,457 Egyptian civil calendar years. Ingham's date of 2769 BCE[*81] came from stepping back in time and using a definition of *heliacal rising* that is slightly different from ours. As our definition, we chose whatever the condition was on 2781 BCE summer solstice, so clearly the twelve-year difference in our starting dates is not a discrepancy and we agree on those cycle durations.[*82]

Now we can reconsider the panels on the Djoser complex monument wall. The eastern wall, with 1,459 panels, may in fact reflect the 1,459 Egyptian civil years of the Sothic cycle preceding its construction. The 1,461 panels on the western wall may reflect the average duration since the last time that the first day of Thoth coincided with Sirius heliacal —a period that lasted for four years, yielding a cycle time of from 1,463 to 1,459 years, which averages 1,461. In addition, the 1,461panel wall may reflect a standardized or general public knowledge cycle (the cycle if the Sirius year was exactly 365.25 days, which would be the first estimate immediately when they noticed that a given Sirius appearance date lasts about 4 years—similar to how the general public today is aware of the simple 4-year "leap year" cycle, but few are aware of the more esoteric exact year cycle that needs to be adjusted over the millennia). The 1,459-panel wall could reflect the esoteric knowledge of the exact natural cycle known only to initiates such as Imhotep. In either case, the difference of 2 years represented on the walls progress in time from east to west could also reflect the changing Sothic cycle—the next one will be 2 years shorter. Further, the difference between the eastern and western wall representations —2 years—appears to be reflected in the northern and southern walls, each of which has 722 panels. Two years equal 720 solar days or 722 sidereal days (we can remember that a sidereal day is the time it takes Earth to complete one rotation relative to the vernal equinox, which is essentially one full rotation with respect to the stars), and it is 4 minutes shorter than a solar day, which is a full rotation with respect to the sun. Thus there is one extra sidereal day in a standard solar year of 365 days, as we can also see because one solar day rotation is taken by Earth moving around the sun in one year. The Sothic cycle is essentially a combination of stellar and solar cycles.

Imhotep seems to be informing us that the ancient Egyptians knew this—and they knew the cycle durations very accurately, for they show this in symbolizing human's unity with the cosmos by synchronizing the human civil calendar with cosmic astrocalendars in their monumental architecture. If we accept that Imhotep knew not only that an approximation to the Sothic cycle was 1,461 Egyptian civil years but also the precise duration of the previous Sothic cycle, then we can believe that he knew that this cycle is a combination of solar and sidereal motions and that he had a concept of the difference between the sidereal day and the solar day. If he did, it is highly likely that he was informed by careful observations going back at least one Sothic cycle, which brings us back to the period of heavy activity at Nabta Playa.

We can also note that this interpretation for the step pyramid complex wall, which otherwise would appear as a needlessly convoluted design, addresses not only the elegant calendar and cosmic meanings of the wall panel design but also the reason why it was built when it was. It was fashioned to mark the correspondence of the summer solstice and the heliacal rising of Sirius, something that happens only once every twenty-six thousand years, and to calibrate that with the first day of Thoth on the Egyptian civil calendar.

Clearly, then, some time around the building and design of the step pyramid complex, a heliacal rising of Sirius occurred simultaneous with the summer solstice and the first day of Thoth. We cannot get to the precise date without knowing the exact way in which the ancient Egyptians determined the heliacal rising or by some other constraint. The Djoser serdab may give us this other constraint. We can remember that the serdab was probably not meant as a precision device—it shows us the king gazing at the area of the sky where Alkaid was at the time of Sirius's rising. Finding a best fit for that alignment may help constrain our date. Somewhere around 2680 BCE may be a good estimate. On that date, on the day of summer solstice, Sirius was at 1 degree above the horizon, the sun was 8.16 degrees below horizon (suitable for a reappearance of Sirius), and Alkaid was at 13.4 degrees altitude and 3.14 degrees azimuth—within the viewing range of the serdab.[*83]

We can almost hear the massive calendar wall announcing, "We now monumentalize in stone our transition from the good old days of acting as nomads around Nabta Playa to a more settled existence in monumental cities, which means that we're going to have to rely more on that civil calendar that nobody much likes because it drifts with respect to the wondrous natural astrocalendar of our ancestors. We're going to have to keep the civil calendar in use for collecting taxes and enforcing legal contracts—but here, in great splendor, is a monument that shows how the two types of time, human time and godly cosmic time, work together."

APPENDIX 3

SAVING NABTA PLAYA

Will the Oldest Prehistoric Astronomical Complex in the World Be Destroyed?

In July 1998, a short letter published in the highly respected scientific journal *Nature* sent a huge wave of interest across scientific communities worldwide. Professor Fred Wendorf, an American anthropologist, and his colleagues, astronomer Kim Malville and fellow anthropologist Romuald Schild, made a startling announcement: they had discovered in Egypt's Western Desert, at a location 100 kilometers (62 miles) west of Abu Simbel, the oldest astronomical megalithic site in the world, predating Stonehenge by at least one thousand years. They called the site Nabta Playa. Wendorf and his team then concluded that the African-origin prehistoric people of Nabta Playa were most probably the ancestors of the pharaohs, and it was them, with their well-developed knowledge of astronomy, agriculture, and cattle-herding, who provided the impetus that inspired the great civilization of ancient Egypt.

The news went around the world like wildfire, and soon many academics were becoming convinced that it was, indeed, in the Western Desert of Egypt (also called the Eastern Sahara or Egyptian Sahara) that civilization began and, eventually, in the fourth millennium BCE spread to the adjacent Nile Valley, where it then spawned the pharaonic culture. In view of this realization, Nabta Playa acquired immense importance for the study of the origins of civilization as well as other elements of early humans, such as astronomy, the domestication of cattle, the development of agriculture, and early religious ideologies. A team headed by Fred Wendorf, calling itself the Combined Prehistoric Expedition (CPE) was allocated a concession by the Supreme Council of Antiquities of Egypt (SCA) to study and excavate at Nabta Playa.

In fact, Nabta Playa was discovered in 1974 by Wendorf and his team, but it was not until the early 1990s that they realized that the many megaliths strewn about the site were not in their natural place but instead had been deliberately placed by humans. Gradually the team became aware that this was no ordinary prehistoric Neolithic site, but instead was a ceremonial complex of unique value. In 1991–1992 the anthropologist Maria Nieves Zedeño, of the University of Arizona, and her colleague Alex Applegate of Southern Methodist University (SMU) joined the Combined Prehistoric Expedition (CPE) under the guidance of Fred Wendorf and Romuald Schild and were assigned the reconstruction of a stone circle—the so-called Calendar Circle. In 1997 the archaeoastronomer Kim Malville of the University of Colorado in Boulder was invited to join the CPE at Nabta Playa. Malville, who had much experience in the study of ancient astronomical alignments, quickly realized that not only did the Calendar Circle have solar alignments to the summer solstice and equinoxes but also that several of the nearby megalithic alignments that emanated from a conglomerate of large stones (called Complex Structure A, or simply CSA) were astronomically aligned to the rising point of important stars: Alpha Canis Major (Sirius), Alpha Ursa Major (Dhube), and the three bright stars of Orion's belt.

Knowing that these stars had also been important to the ancient Egyptians in their sky religion (as expressed in the Pyramid Texts and other funerary literature, such as the Coffin Texts, the Book of the Dead, and the so-called Carlsberg Papyrus), Wendorf, Schild, and Malville published a series of articles (their most recent in 2007) in which they expressed their strong suspicion that the evidence found at Nabta Playa (the stellar and solar alignments, the cow cult, the burial customs) shows a direct connection to the pharaonic civilization of the nearby Nile Valley. This hypothesis was further fortified by the fact that radiocarbon dating at Nabta Playa showed that the presence of the people who had populated this desert region ceased to exist at around 3400 BCE, when the southwestern desert of Egypt became superarid—a date that most tellingly, coincided with the emergence of the pharaonic civilization in southern Egypt along the Nile. It very much seemed that the more ancient people of Nabta Playa migrated to the nearby Nile Valley, bringing along their body of astronomical knowledge and domesticated cattle that kick-started the pharaonic civilization.

In view of the immense cultural importance of Nabta Playa, however, the supervision and protection of the site during the periods when the CPE team was not there was practically nonexistent. The CPE was generally present on the site from around January to the end of March, but before and after this the high temperatures of the region made any work very difficult if not impossible, and thus Nabta Playa was left without any security system or guards. When the astrophysicist Thomas Brophy visited Nabta Playa in October 2003, there was no one on the site, and he noted the lack of

any sign or fencing or official notice that indicated that this was an archaeological site. Brophy took extensive photographs of the megaliths, which he eventually published in magazines and scientific journals. Along with the Calendar Circle, Brophy visited the remains of the excavation of Complex Structure A, where he found several megaliths strewn about the site where the central cow stone sculpture had been removed.

Directly from Nabta Playa, Brophy went to the Nubian Museum in Aswan and met with its director, who is also the SCA official in charge of archaeology in the region. Brophy was told the cow stone sculpture was being held in the back of the museum, in a closed storage area, awaiting the construction of a pedestal so that it could be displayed prominently at the front of the museum. Brophy asked to see the sculpture and was escorted by an AK-47-armed guard, at night, to the location where he found the megalithic sculpture damaged and broken.

In 2007, Robert Bauval also decided to visit Nabta Playa, and he duly informed Dr. Schild, who replied that he, too, planned "to be at Nabta Playta in January and early February 2008." On November 18, 2007, Bauval and some of his friends and colleagues (Dr. Carmen Boulter of Calgary University, professional cameraman Eric Phillips-Horst, Michele Bauval, and the photographer Joanne Cunningham) arrived at Nabta Playa. With them were an officer from the Egyptian military and a local guide, Muhammad Nemr, as well as two drivers provided by Nemr, who had been responsible for obtaining all the necessary permits from Egyptian National Security. Dr. Boulter had also applied for a filming permit from the Ministry of Information and the Supreme Council of Antiquities. Upon arriving at Nabta Playa in the early part of the afternoon, they found a group of tourists with the British Egyptologist Dr. Nicole Douek. This group had arrived earlier that morning and were now about to leave for Gilf Kebir, a mountainous region that was several hundred kilometers to the west of Nabta Playa. Dr. Douek invited Robert Bauval to give a short talk to her group on the astronomy of Nabta Playa. She also agreed to give an on-camera joint interview with Bauval. After Dr. Douek and her group departed, Bauval and his colleagues examined the Calendar Circle and other artifacts in the area, taking many photographs and much video footage.

A few months later, in April 2008, Thomas Brophy came to Cairo to join Robert Bauval in an expedition to Gilf Kebir and Jebel Uwainat. It was after this expedition that, on April 17, 2008, Thomas Brophy revisited Nabta Playa. The required permits were obtained for him by the local guide, Muhammad Nemr, who also took Brophy and an officer from the Egyptian military to Nabta Playa. Upon arrival at the site, Brophy noticed that the Calendar Circle had been severely disrupted: many of its stones had been dispersed and moved. It also seemed that there were some stones missing, especially a beautifully shaped stone, which he had photographed in 2003. Brophy also noted that a large megalith from Complex Structure A was missing. When he returned to Cairo, Brophy visited Bauval, and they compared photographs taken in November 2007 (by Bauval) and those taken in April 2008 (by Brophy). It was quite evident that the Calendar Circle in the November 2007 photos was very different from the one in the April 2008 photos. More troubling still, when he was at Nabta Playa, Brophy noted that much rubbish had been dumped on the eastern side of the area, at the foot of a sand dune where the CPE team usually camped.

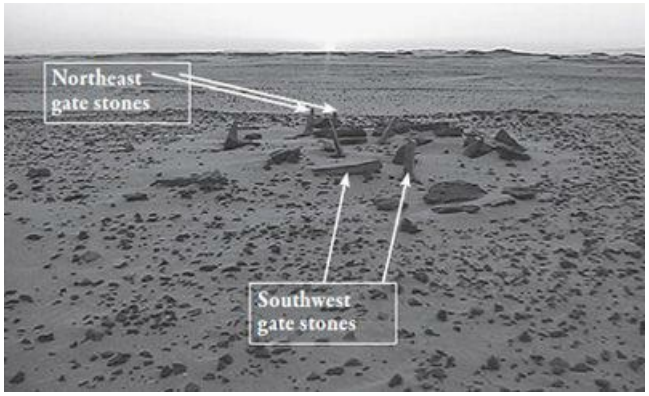

Figure A1. Calendar Circle, sunrise, October 2003. Since the 1999 image was taken, some stones have been removed, toppled, and possibly replaced.

Figure A2. Rubbish dumps in the central area of Nabta Playa, 2008.

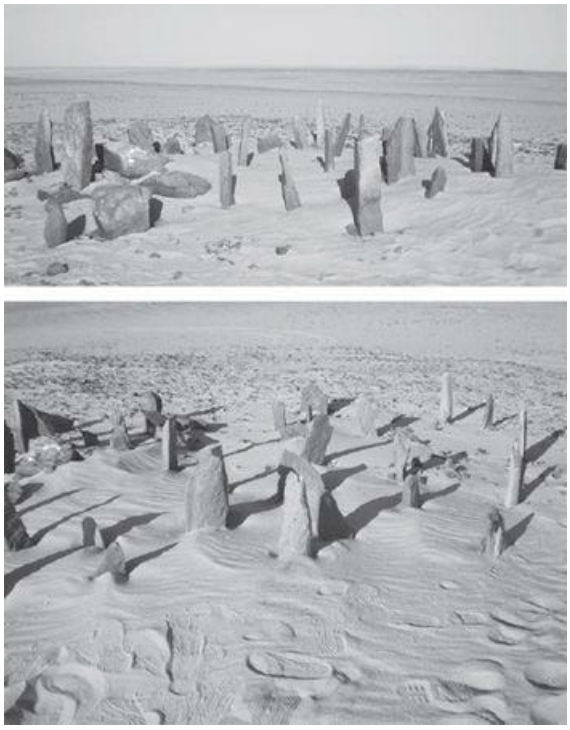

Figure A3. Top: Calendar Circle, November 2007. Bottom: Calendar Circle, April 2008. The arrangement has been altered yet again and has been partially reconstructed.

Bauval decided to return to Nabta Playa on May 8, 2008, to assess the situation. He was thus able to confirm that the Calendar Circle had, indeed, been much tampered with and that there were signs of other disruption on the site. A prehistoric stone sundial that he had photographed in November 2007 was badly ravaged. In addition there were heavy vehicle tracks around the megaliths and several open rubbish dumps near the sand dunes. Elsewhere a prehistoric grinding block was missing and another was broken in two. Bauval decided to go to the Nubian Museum at Aswan the next day to ask the director what had happened at Nabta Playa between November 2007 and April 2008. In the afternoon of May 9, 2008, Bauval met Deputy Director Dr. Ragheb of the Nubian Museum. He informed Bauval that, upon instructions from Dr. Schild, three large megaliths from Nabta Playa had been brought to the Nubian Museum in February 2008. Dr. Ragheb showed Bauval the three megaliths, which were in the yard of the museum. Dr. Ragheb also showed Bauval a large megalith known as the cow stone, which had been brought from Nabta Playa several years before. This cow stone, which had been buried several meters beneath CSA, had unfortunately been damaged (broken into two parts). When Bauval inquired about the Calendar Circle, Dr. Ragheb insisted that the stones had not been removed and were still in their original position on site. Dr. Ragheb knew nothing of the rubbish dumps.

Soon after, Bauval contacted Romuald Schild. In a series of e-mails received from Dr. Schild between May 15 and June 12, 2008, Bauval was informed that the CPE had been aware that unauthorized visits to Nabta Playa by tourists had taken place over the years. According to Schild, an estimated one thousand unauthorized tourists had come to Nabta Playa in the past decade, and there was evidence that they had tampered with the Calendar Circle several times and had even made a reconstruction and built a New Age stone circle around an upright prehistoric marker near C-group house. Schild added that the original Calendar Circle was removed from its place in February 2008 to be reconstructed in the Nubian Museum. In its place the CPE had added a modern reconstruction of this monument. Apart from this, Schild stated that he did not know of any very recent, serious damages except for some bulldozer work around the stele that were removed in February to be re-erected at the Nubian Museum in Aswan. As to why Dr. Ragheb denied that the

Calendar Circle had been moved to the Nubian Museum, Schild offered that either Dr. Ragheb did not want to disclose the information to Bauval or that he had misunderstood Bauval's question. Schild insisted that "the calendar, and other selected Nabta monuments, had been removed from their original place on February 18, 2008, in my presence as well as in the presence of a number of the members of the Expedition and a Special High Committee of the Supreme Council of Antiquities headed by an Undersecretary of State. The entire removal was filmed and intensively photographed. The antiquities were immediately taken to the Nubian Museum in Aswan in a separate convoy escorted by the police. Dr. Osama, Director of the Museum, received the convoy and its load at the Museum."[1]

Figure A4. Top: Robert Bauval and the director of the Nubian Museum with the broken cow stone scupture, April 2008. Bottom: Bauval and John Anthony West examine a piece of the broken cow stone at the Nubian Museum in 2003.

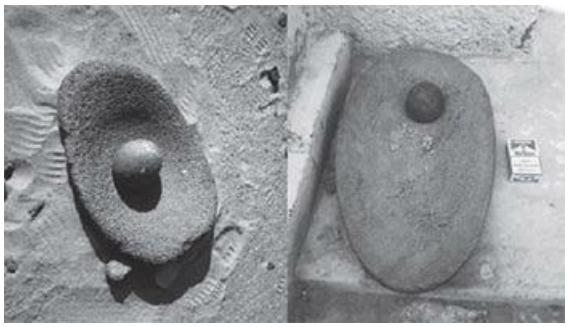

Figure A5. Left: Prehistoric grinding block seen near Nabta Playa in 2007. Right: A similar grinding block used as an ashtray at a hotel.

As for the rubbish on the site, Schild at first offered that it had been left by tourists. When Bauval, however, said that the evidence pointed to the rubbish being from the CPE, Schild offered that perhaps it had been interred in a pit and now, for some unknown reason, someone had excavated the pits and exposed the rubbish. On June 12, Bauval received an e-mail from Dr. Schild in which Schild stated that "since May 2007 I am not heading the CPE any more, although, I have been responsible for some of the projects carried out by the CPE, like the archaeological operations undertaken in conjunction with the Egyptian Supreme Council of Antiquities, i.e., salvage of Nabta monuments." It was also at this stage that Dr. Schild informed Bauval, "Nabta has been earmarked for an extensive reclamation, i.e., total destruction, as a part of the Tushka project."

Since 1997, the Egyptian government has launched a series of large civil engineering projects to reclaim the arid Western Desert and turn 1.5 million acres into agricultural land. The projects are broadly divided into two parts: (1) to build a canal fed by Lake Nasser that will deliver billions of cubic meters of water to irrigate various regions of the desert as far north as the Qattara Depression, and (2) to extract groundwater from natural aquifers, mostly from the east Uwainat region, a few hundred kilometers west of Abu Simbel. To date the first phase of the canal project, known as the Sheikh Zayed Canal, has been completed. It involves a 70-meter-wide (230-feet-wide) concrete-lined canal that is fed by

a huge pumping station (the Mubarak Pumping Station). At its terminus, the canal splits into four branches, each about 50 kilometers (31 miles) long, which will be used to irrigate the adjacent desert lands. The whole region where the canal and its branches run is known as the Tushka Depression or Basin, and these projects are collectively known sometimes as the Tushka Project. (The official name of the collective project is the Southern Egypt Development Project.) The project that most threatens the Nabta Playa area is the east Uwainat groundwater project, which, according to the Egyptian government, would irrigate 200,000 feddans (acres) in the region. Nevertheless, as Schild himself admits, "recent financial problems facing the project brought a temporary stop to these plans, although all the planning work, designs, drilling for water, survey, soil assessments, etc., of the area have been finished."[2] In addition, according to Schild, "exempting Nabta from these governmental plans by the SCA has not yet been successful." It is because of this, says Schild, that "the CPE has been very intensively recording all the megaliths and related monuments at Nabta, e.g., we have just finished mapping, in the scale of 1:50, all the megaliths and their fragments, together with the associated quarries, in the entire Nabta Basin."[3]

We felt it was important that UNESCO World Heritage be consulted on this matter. Communications were sent to both the UNESCO World Heritage headquarters in Paris and its offices in Cairo. UNESCO funded the creation and operation of the impressively built Nubian Museum of Aswan. No reply, however, has yet been received. We also contacted Dr. Malville, the astronomer who was a member of the CPE and who had been responsible for the study of the Calendar Circle and the megalithic stellar alignments at Nabta Playa in 1997–1998. Oddly, Dr. Malville had not been consulted or even informed of the removal of the Calendar Circle. We also communicated with the Egyptian astronomer Dr. Mosalam Shaltout, who had been involved with the study of Nabta Playa. Dr. Shaltout had also not been informed of the removal of the Calendar Circle. We hope that with the publication of this text an alarm bell will be heard by the archaeological and anthropological communities in the hope of salvaging the Nabta Playa prehistoric site as well as other monuments that may be threatened by ongoing desert reclamation projects.

April 2010 update: Unauthorized visits to Nabta Playa are still taking place. To our knowledge, no security system has been put into place, and the site still remains unprotected. We are given to understand that no official announcements have been made by the Nubian Museum in Aswan or the Supreme Council of Antiquities as to what is planned for the Calendar Circle and other monuments that were removed from the site. On April 7, 2010, Robert Bauval discussed the matter with professor Salima Ikram of the American University in Cairo. She offered to look into this matter.

February 2011 update: As these pages go to press, stunning events are sweeping through Egypt. On January 25, popular democratic protests began in Tahrir Square. On January 31 a new "Ministry of Antiquities" was created by the besieged dictator Hosni Mubarak, and Zahi Hawass was made minister. On February 11, amid charges of rampant and pervasive corruption, Hosni Mubarak resigned after twenty-eight years in power, the entire Mubarak government was dissolved and power transferred to a temporary military council, ostensibly to prepare for democratic elections. All former government ministries are in a state of uncertainty. We sincerely hope these events will lead to a democratic Egypt born anew and with a reinvigorated care and love for its astonishing ancient past.

Footnotes

*1. *The English Patient,* 1996, features Ralph Fiennes and Kristen Scott Thomas. The so-called Cave of Swimmers (which is actually in Gilf Kebir's Wadi Sura), where the heroine, Lady Clayton, dramatically dies, was also filmed not on location in southwest Egypt but in Morocco. The real Lady Clayton actually died many years later in England by jumping from the open cockpit of her airplane and breaking her neck against a metal bar.

*2. As the historian of science Jed Z. Buchwald describes, the Dendera ceiling was constructed in the interregnum years after the death of Cleopatra's father, Ptolemy Auletes, in 51 BCE, when there was no king and therefore no royal name to put in the cartouches. We note, however, that is the date of the construction of the ceiling. There is still uncertainty regarding the date(s) to which the actual contents of the zodiac itself may refer. We caution the curious reader that before launching off to date the Dendera zodiac again, it is best to be aware that no less than the likes of LaPlace, Fourier, and Biot expended significant efforts at extracting dates, and their results remained inconclusive.

*3. [Bey is a Turkish title for "chieftain." —Ed.]

*4. The eccentricity is currently about 0.017, meaning that Earth is 3.4 percent closer to the sun during closest approach compared to the farthest it is from the sun in the yearly orbital cycle. The gravitational pull from Jupiter, Mars, and the other planets causes the eccentricity of Earth's orbit to vary from a mostly round path (0.005) to a more elongated one (0.058) in a complex cycle of about one hundred thousand years. Also, the time of year when Earth is closest to the sun varies. Currently, Earth is closest to the sun on January 4 (perihelion).

*5. Oddly, in all subsequent publications on Nabta Playa by Malville et al., there is no more mention of this highly accurate due-east alignment.

*6. As the primary member of a set of circumpolar stars.

*7. Some scholars who emphasize the cultural approach rather than the physical approach to archaeology claim this method of analysis or puzzle-solving is invalid, because, they say, any proposed astronomy should be linked directly to ethnographic justifications—that is, we should have access to other evidence, including writings or stories, already proving that the specific people who built the structure in question were in fact interested in the proposed astronomy. We absolutely agree that ethnographic justifications greatly improve the validity of any archaeoastronomical finding, but we also note that considering astronomy first and then, subsequently, considering the ethnographics is equally scientific.

*8. Of course, critics chime in at this point: "There is no reason to assume the Calendar Circle builders were interested in the stars of Orion's belt. Therefore it is pseudoscientific to consider such a solution to the Calendar Circle puzzle!" Our answer is that we must not start with ethnographic associations or presumptions. In fact, for the moment, we exclude from the puzzle as we have defined them ethnographic assumptions in order to have a well-defined question that involves only simple physical astronomy and a man-made pattern of stones on the ground. Further, to isolate a problem by employing well-defined parameters is actually good scientific method. If we come up with a solution to the well-defined simplified astronomy puzzle, then we can consider whether there are or are not ethnographic justifications. This is at least as scientific a procedure as starting with ethnographic presumptions in the first place.

*9. The constellations change shape very slowly over long periods of time due to the so-called proper motions of stars. All the stars are moving with respect to each other, like billiard balls scattering on a pool table—though at extremely slow, angular rates.

†10. The Bible mentions Orion three times: Job 9:9, "He is the maker of the Bear and Orion"; Job 8:31, "Can you loosen Orion's belt?"; and Amos 5:8, "He who made the Pleiades and Orion."

*11. One key aspect of this interpretation is the visibility of the stars on the meridian. Also, given that solar zenith crossing was considered to be of significance to the Neolithic people and that at Nabta Playa the sun crossed the zenith two days per year—21 days after and 21 days before the day of summer solstice—we can use this information to define an operational window for the Calendar Circle (that is, those years when the Orion's belt stars would have been visible on the meridian in the proper configuration any time during those six weeks around summer solstice). Further, we estimate that the stars could be seen in the sky up to about forty-five minutes before the sun rises above the horizon. This gives an end date to the Calendar Circle operational window of about 4800 BCE. The start of the window is when the configuration angle and altitude become a good match, which we estimate to be about 6400 BCE.

In actual practice, though, the device may have been used after 4800 BCE, especially if its interpretation was known.

*12. Though we do not see why it should be considered impossible, such an extremely ancient date would mean the Calendar Circle would have had to survive through thousands of years of wet Sahara conditions and through periods of heavy human use. Instead we think the device was constructed and used during the recent epochs of significant human activity and then was abandoned when the area became hyperarid—and thus the construction survived mostly intact to modern times.

*13. Our interpretation does not require precision knowledge of astronomy or precision matching to the stone diagram, as some have objected. We did calculate the star locations with accuracy and precision only because there is no reason not to do so. Further, we noted that the astronomy matches the field archaeological reconstruction precisely, because it happens to, but the validity of our interpretation does not depend on such precision. If the field archaeology drawings turn out to be a bit incorrect, our case for this interpretation is not hindered in any way. Of course, however, certainly if these drawings are completely in error, then any interpretation based on them suffers.

*14. As we suggested in our earlier book, *The Origin Map*. Essentially the megalith alignments were consistent with the C1 line, indicating the stars of Orion's belt at the early date of 6200 BCE; and the B1 and B2 lines of megaliths, indicating stars of Orion's head and shoulders as suggested by the Calendar Circle; and the three lines A1, A2, and A3, indicating the brightest star in the north, Vega, at simultaneous times with the Orion stars.

*15. J. M. Malville, R. Schild, F. Wendorf, and J. Brenmer, "Astronomy of Nabta Playa ," *African Skies/Cieus Africains,* no. 11 (July 2007). The authors further suggested that the B1 and B2 megalith alignments may have been intended to indicate Sirius on two different dates—ca. 3500 BCE and ca. 4500 BCE—and possibly also Orion's belt ca. 4200 BCE or Alpha Centauri ca. 4400 BCE. They also proposed a new target for the A1, A2, and A3 lines toward the bright star Arcturus at ca. 4500 BCE to 3600 BCE. In addition, they recommended that because many of the megaliths, which they determine stood as stele when they were intact, are now scattered and fragmented, an uncertainty of order of a half degree azimuth should be included when we try to ascribe star alignment dates to the megaliths. Finally, they abandoned one major alignment of megaliths, the C line, and chose not to interpret them, noting they they are in a more distant area that may have been removed from the playa.

*16. For any extremely rigorously minded scholars we note again that this correspondence of the megaliths to this interpretation of the stars happens to be rather precise—but our interpretation does not depend on such precision. For alignments such as these, even within a half-degree or so, correspondence would be considered a good match. It is possible that the Neolithic builders and the way the stones toppled throughout the millennia happened to produce such precision.

*17. We can note that the precise rate of precession is variable with time, and we use in all our calculations the modernly calculated exact variable precession rate. The exactness of a number such as 2,166 for a zodiac age should not be overly emphasized.

†18. Nabta Playa is centered at 22.5 degrees north latitude, giving the horizon there a geometric declination of 90 − 22.5 = 67.5 degrees, but astronomers generally use the visual horizon, which is a half-degree lower due to atmospheric refraction of Earth's atmosphere bending starlight, or about 67 degrees for the declination of the visual horizon at Nabta.

‡19. Dubhe became an eternal star, always above the horizon, in around 3500 BCE, but perhaps it was considered circumpolar enough by around 4500 BCE.

*20. The star Vega, on the opposite side of the sky from Orion, had its autumnal equinox heliacal rising around 5840 BCE, when it was in the center of the A megaliths—essentially, at line A2. In our previous publications we have noted that the other alignments (B lines and A lines) were consistent with Vega in the north rising simultaneously with the Orion shoulder stars that are also indicated in the Calendar Circle. Yet we note here that those alignments, if represented by the present megaliths, must be re-creations of previous markers that are now beneath the playa sediments, because those particular Vega and Orion alignment dates precede the final heavy sedimentation period. Given that the complex structures also contain evidence of a much earlier symbolic landscape carved on the bedrock under the playa sediments, it seems the interpretation that the A line and B line megalith indicated Vega and Orion at the earlier dates (in addition to the later post-heavy sedimentation alignments) may still be viable. Indeed, as we will see, there is evidence of symbolic architecture involving these stars—Sirius, Orion's belt, and Vega—going back to the First Time, or Zep Tepi, at Giza, circa 12,000 BCE.

*21. If we assume that the Sirius–Big Dipper simultaneous star alignments extended back to 6100 BCE, we may

logically ask why, if Sirius rising was tracked for as long as two millennia or more, there are not more alignments beyond the three major ones identified thus far. The geological sedimentation history of the playa may provide an answer. If the earliest line "C-line" is off the playa or on fossil dune hills not affected by the late heavy playa sedimentation period, then possibly there were a sequence of alignments to Sirius rising as Sirius's location marched north via precession through the playa, from the C-line megaliths to the B-line megaliths. Those alignments would be gone or invisible now, covered by playa sediments. Only the 4500 BCE and 3500 BCE alignments survive because they were placed after the heavy sedimentation stopped.

*22. Today the precise angular separation of Dubhe and Sirius is 93.4 degrees. Yet both Sirius and Dubhe are relatively close to our solar system, about 8.6 light-years distant and 124 light-years distant, respectively. Thus they have a fairly large proper motion (the apparent motion of individual stars against the backdrop of distant "fixed stars"). Combining the best recent measures of their proper motions, we can calculate that Sirius and Dubhe are moving away from each other at a rate of about 0.34 degree per thousand years. About 4500 BCE, then, they were separated by 91.2 degrees, and they formed a perfect 90 degrees—a right angle—in the sky around 8160 BCE.

*23. Sirius is about 1 degree above the horizon as the sun is about 5 degrees below the horizon.

†24. When it is just under 3 degrees above the horizon and the sun is about 6 degrees below the horizon, before rising.

*25. When Sirius is about 1 degree above the horizon and the sun is about 6 degrees below the horizon.

*26. This attitude perhaps harks back to premodernity, which was characterized socio-culturally by often prerational and fused (or predifferentiated) notions of the dualities of theory versus measurement, mind versus matter, inner versus outer, religion versus science. Modernity is characterized by a radical differentiation of these dualities. That differentiation is the wonderful essence of the Scientific Revolution and the Renaissance. Post-modernity, which is only beginning to activate in our culture, is characterized by fully rational operation, a complete appreciation for the modern and Renaissance differentiation of the inner and the outer, the spiritual and the material—and an awareness of the value of both aspects of those dualities and a movement toward a reintegration, at a fully differentiated level, into a new, whole conception of those dualities. Scholarly argument must still operate generally in terms of modernity, because this is how the majority culture operates . . . on a good day, that is. Obviously, vast portions of our culture still operate in the premodern and prerational modes.

*27. Initially we were skeptical of the sculpture's cowlike appearance, and we suggested that because it was at the centerpiece of astronomically oriented megalithic alignments, it too may have astronomical meaning. [See Thomas Brophy, *The Origin Map: Discovery of a Prehistoric Megalithic Astrophysical Map of the Universe* (Bloomington, Ind.: iUniverse, September 20, 2002)].

†28. There is no agreement among astrologers or astronomers as to exact beginnings and endings of the zodiac Ages. A zodiac Age is when the vernal equinox sun resides in the sky against the backdrop of a given zodiac sign, or constellation of stars. The beginning of an Age depends on where in the starry sky we choose to draw a zodiac sign boundary. There may in fact be another curious correspondence to zodiac Age symbology in the Calendar Circle. We can recall that the window of applicability of our Calendar Circle interpretation was determined to be roughly 6300 BCE to 4800 BCE. That span of time is very similar to the zodiac Age of Gemini, which immediately precedes the Age of Taurus. Indeed, our interpretation of the circle is that it twice represents the figure of Orion, and the physical size of the circle is 4 meters (about 13 feet)—the size of two men. If we consider the size of the constellation Orion when it matched the stone circle, in the later date (ca. 4900 BCE), Orion is larger—when the stars are rising (north toward the pole) on their precession cycle—and in the earlier date (ca. 16,500 BCE) Orion is smaller—when the stars are falling (south away from the pole) on their precession cycle. Could a more subtle layer of symbology be present in the Calendar Circle also indicating the Age of Gemini, with the burial of the cow stone marking the start of the Age of Taurus?

*29. In Thomas Brophy, *The Origin Map: Discovery of a Prehistoric Megalithic Astrophysical Map of the Universe,* using purely astronomical puzzle-solving applied to the field data and drawings, we found, partly, that the CSA and the bedrock sculpture appeared consistent with a representative map of our Milky Way Galaxy and seemed to be an indication of Earth's location in the galaxy. We have noted that this solution was not connected with known cultural archaeological evidence. Further, we asked ourselves that if somehow this representation was the meaning of the sculpture, how could that knowledge have been acquired? It must have been attained in one of three ways: (1) through some very ancient possession of astronomical instrumentation, knowledge of which was totally lost over the ages; (2) through some way of perceiving the universe (such as remote viewing) that was accessible to the ancients, though we

are not now capable of this perception; (3) through receiving the knowledge from some outside source. These possible methods stimulated thought and questioning, as we had intended, but they also generatad some hysterical responses from both ends of the spectrum of thought. We did not, as Malville et al. claim in their 2007 report, "propose that the nomads had contact with extra-galactic aliens."[24] Further, they go on to say, "Brophy proposes that the stones of the cromlech represent maps of the stars of Orion as early as 16,500 BC. These extremely early dates . . . are inconsistent with the archaeological record."[25] Yet we did not propose the cromlech (Calendar Circle) was built in 16,500 BCE. We suggested, however, that it represented the long-term precessional motion of the sky and was built and used circa 5000 BCE. Generally science is advanced by the exercise of imaginative problem-solving applied to accurate data and calculations, even if some speculations may not be upheld by more extensive data collection, and science is hindered by applying only conventional reasoning, especially to flawed data and incorrect calculations.

*30. X-1 is indicated in a low-resolution version of the Quickbird image in Brophy and Rosen, "Satellite Imagery Measured of the Astronomically Aligned Megaliths at Nabta Playa," *Mediterranean Archaeology and Archaeometry* 5, no. 1 (June 2005): 15–24.

*31. http://en.wikipedia.org/wiki/Listofhieroglyphs/german-Gardiner-list-translated#S-Crowns

*32. In the article about his expedition published in *Geographical Journal,* Bagnold supplied only a rough mark on a map with a scale of 1:10 million units of scale. Due to the extreme remoteness of the area combined with the paucity of information about the circle's location, it was visited little or not at all at least until the 1990s, when four-wheel-drive jeep desert travel became readily available in Egypt. The first known visit was in 1998 by a small group calling themselves Zarzoora Expeditions of Wael T. Abed. We are lucky to have the very good black-and-white photograph taken by Ralph Bagnold when he discovered the site in 1930 and from which we can determine the original state of the stone circle.

*33. Both Bagnold in 1930 and the FJE in 2001–2002 say that no implements or artifacts were found in or near the circle. According to the FJE: "We could confirm Bagnold's observation that no stone implements were to be found in the vicinity. A kilometer (about 3.280 feet) away, near our campsite, a broken aterian biface [*sic*] and some crude flake tools were noted, but no concentration of artifacts that would indicate any larger permanent settlement." In April 2008, however, we did, in fact, find a rather beautifully worked stone implement, a knife or perhaps the tip of a lance, at a place only 150 meters or so (about 492 feet) west of the circle, among numerous other man-made stone artifacts. In addition, to the south of the basin there is a gently sloping area, possibly the shore of the ancient playa, with adjacent lines and rows of small rectangular-shaped parcels divided by bits of stones and small upright slates that are still embedded in the sand. (These uprights could be the outlines of small agricultural plots near a prehistoric village, evidence of which was found in a circular gathering of stones that seemed to be the outline of a primitive habitation.) In light of finding the numerous man-made stone artifacts lying on the surface, similar to the initial finds at Nabta Playa, we considered other general similarities between Bagnold Circle and Nabta.

†34. Some kilometers to the west, as we later headed toward the northern edge of Gilf Kebir, we came across the remains of a prehistoric settlement, probably from the late Neolithic, where we found several circles of stones marking the outline of habitations, as well as many stone implements. There can be little doubt, in view of these findings, that there was much human activity in the area, some sedentary, some nomadic, and some perhaps even pastoralist (though no evidence of cattle or other bovine has been found yet near Bagnold Circle). We must be privy to further explortions to confirm this, and the site clearly seems suitable for an extensive survey by field archaeologists. Unfortunately, given that no traditional professional Egyptologists have even managed to visit Bagnold's site because of its remoteness from the Nile, it may continue to suffer from obscurity. Due to the flat, dry, playa sediment–like conditions of the terrain, however, the site may be a good candidate for study by the new generations of high-resolution synthetic aperture satellite radar with remote sensing, which can see beneath the surface layers of sediment.

*35. We also verified the north–south (meridian) alignment at night by aiming at the Pole Star and in the daytime with a simple gnomon's noon shadow. In addition, in the distance directly north of the circle there is visible a lone mountain peak that could have been ritually significant to the placement of the circle.

†36. We don't list the precise coordinates here because important sites in the Egyptian Western Desert have been left essentially unprotected. Even the extremely important and relatively accessible Nabta Playa is left unguarded, with nothing to protect it from damage but (we hope) the good sense of any visitors. The much more distant and remote Bagnold Circle is very unlikely to be protected.

*37. The text simply says that Ham ". . . saw the nakedness of his father . . ." in private and implies that he did something

unspeakable. Many scholars believe it was a sexual act or perhaps even castration. (The castration interpretation comes from the fact that Canaan is Ham's fourth son, and so Noah's banishing of Canaan from the family lineage could be revenge for Ham prohibiting Noah from having a fourth son himself.)

*38. Religious Jews and Arabs today both consider themselves sons of Ham's brother Shem through Abraham, who is considered to be a descendant of one of Shem's five sons, Arpachshad (eighth generation descendant, according to the Book of Genesis), via Abraham's two sons, Isaac and Ishmael. Further, according to the Exodus story, Moses is the fifth generation descendant of Isaac.

*39. In this chapter, we are focusing on the evidence regarding the color of the people who were the progenitors of the ancient Egyptian civilization. Regarding the term race, we note that contemporary specialists in human genetics, such as S.O.Y. Keita, point out that there are and have been human population groups with variation and fluent characteristics, such as skin color, but the genetic variabilities are such that the classical use of the term *race* has little scientific value.

*40. Thomas Brophy notes that from recent generations, he himself is a mix of European ethnicities, but he does consider himself a member of humanity, and thus, as we describe in this chapter, about two hundred thousand years ago, he was Black African. Brophy was raised mostly secular with some attendance at Christian churches, but after obtaining a Ph.D. in physics, he wrote a book that describes a view of the unity of all major religions within the context of modern physical science.[41]

*41. A franchise that sells evergreen trees at Christmas and pumpkins at Halloween.

*42. In 1934 Enrico de Agostini discovered a prehistoric burial ground at Ain Doua on the Libyan side of southern Uwainat. It offered well-preserved pottery and two skeletons, which were apparently taken to Florence, Italy, but were very damaged during transportation and during the famous flood that hit the Florence area in 1966. The pots, however, are displayed today at Florence Archaeological Museum.

*43. In 2001 Robert Bauval and John Anthony West went to examine the cow stone at the Nubian Museum and, sadly, found it damaged and broken into two pieces. Apparently, the accident happened during transportation from Nabta Playa.

†44. In the Dendera zodiac, Isis-Sirius is shown as a crouching cow, and elsewhere she appears as a woman wearing a headdress with cow horns.

*45. Azimuth is measured in degrees all around the horizon: 360 degrees, with the zero point being due north.

†46. Note that this change in rising azimuth depends on the starting azimuth of the star. Roughly about 1 degree applies, for example, to Sirius.

*47. Like the Masai of Kenya and the Dinka of Sudan, the Nabta cattle people probably drank the blood of live cattle by inserting a straw into their jugular, and they likely only rarely slaughtered a calf for meat, perhaps only on special feast days or for ceremonial purposes.

*48. A cataract is a change in the level of the river. In all, on the Nile there are six main cataracts, and the sixth is just north of Khartoum in Sudan.

*49. The first phase of the Satet (Satis) temple was an early-dynasty hut built into the corner of the three-boulders enclosure. In the third dynasty this was enlarged and a fore-court was added. Further work took place in the sixth dynasty, and various new temples were constructed on top of the ruins of the earlier one during the eleventh and twelveth dynasties, especially by the pharaoh Sesostris I. In the New Kingdom, the eighteenth-dynasty queen-pharaoh Hatshepsut had the Satis temple completely rebuilt some 2 meters (7 feet) higher than the original three boulders. The eighteenth-dynasty edifice was then extended to the east during the Ramesside period and again in the twenty-sixth dynasty. Finally, a totally new temple was built over the ruins of the last one during the Ptolemaic period.

*50. The Egyptologist Gaston Maspero explains that Krophi and Mophi are Qer Hāpi (Cavern of the Nile God) and Mu-Hāpi (Water of the Nile God).

*51. The latitude of Elephantine Island, 24.08 degrees north, precisely equaled the Tropic line circa 3760 BCE. By 3300 BCE, the Tropic line had moved down to 24.045 degrees, which was essentially the same.

†52. According to Ron Wells, Sirius had to be at an altitude of 10.48 degrees in order to be seen when observers took into account the high knoll that rises on the east bank of the river (today occupied by the Old Cataract Hotel).

*53. Actually, it is 365.242 days, to be exact.

*54. Some scholars suggest this date is also astronomical—occurring at the beginning of the zodiac Age of Pisces, and hence the reason why early Christians adopted the fish as the symbol of their age.

*55. The Hebrew called Sirius Sihor, and the Romans called it Sirio or Canicula—the Dog.

*56. The altitude of Sirius is taken as 1 degree above horizon and that of the sun 9 degrees below horizon. Sirius would have had an azimuth of 109 degrees 16 minutes.

*57. *The Orion Mystery* was first published by Heinemann in 1994. It was a bestseller in the United Kingdom and was an international bestseller. It has been translated into more than twenty languages.

*58. The number of days that a star takes to return to the same point, usually measured at the meridian transit. The rising of a star, such as Sirius, occurs about 4 minutes longer than sunrise each day, thus it "looses" 1 day in the solar year.

*59. A sidereal day is the time it takes Earth to complete one rotation relative to the vernal equinox, which is essentially one full rotation with respect to the stars (hence the word *sidereal*). It is four minutes shorter than a solar day, which is a full rotation of Earth with respect to the sun. Thus there is one extra sidereal day in a standard solar year of 365 days, as we can see, because one solar-day rotation is taken up by Earth moving around the sun in one year.

*60. The word *Hwt* ("Hat") . . . was used in the New Kingdom with the meaning "Temple."

*61. The heliacal reappearance of Sirius occurred before the day of summer solstice in early dynastic times, before about 2600 BCE, and it occurred after summer solstice in later years up to today.

*62. Lockyer actually took in situ measurements and concluded that the alignment of the Isis temple was 18 degrees 30 minutes south of east; this was also roughly the average of the measurements obtained earlier by Lepsius and Mariette.

*63. Lockyer's calculations that the main temple was aligned to Dubhe (Alpha Ursa Major), the brightest star in the Bull's Thigh constellation, were based on very early dates that do not apply to the existing temple.

*64. Evidence of an earlier presence at Abu Ruwash is attested by found objects that bear the names of kings of the first dynasty, Aha and Den.

†65. The azimuth of the rising sun at summer solstice was nearly 28 degrees north of east. If we allow for 2 degrees altitude for the full disk to be seen over a mound or obelisk from Abu Ruwash, the azimuth is nearer to 27 degrees north of east.

*66. According to Miroslav Verner, the name Abusir derives from the Greek Busiris, which was taken from the ancient Egyptian Per Usir, meaning the Realm of Osiris.

*67. Actually, the term *Neolithic* was originally devised by anthropologists in 1865 to refer to a stage of human cultural development defined by the types of tools used (*lithos* is "stone" in Greek), rather than to refer to dates. Over the decades, as scholars developed a sort of canonical view, the actual dates believed to apply to the various cultural developmental stages (Early Neolithic, Middle Neolithic, Late Neolithic, Terminal Neolithic) gathered an air of certainty, though the dates of each stage were believed to be different for different geographic regions of the planet. Over time terms such as *Late Neolithic* became almost interchangeable with actual dates, rather than cultural type. At Nabta, however, Wendorf himself notes that, regarding the megalithic constructions there, "[b]uilding large stone monuments was not expected among such groups."[1] These very findings have changed the concept of what is Neolithic and are changing our understanding of the time period to which the term will apply. To avoid confusion, then, we refer mostly to actual dates rather than conventional terms such as *Middle Neolithic.*

*68. Sirius is the brightest star of all. At visual magnitude −1.46, it is significantly brighter than Vega, but Sirius is in the Southern Hemisphere.

*69. Atmospheric refraction affects the apparent viewing angle of a star significantly only when very close to the horizon —by up to about 0.56 degrees on the horizon. At an altitude of 26.5 degrees, the altitude of the subterranean passage, the atmospheric refraction would be very small, less than 2 arc minutes.

†70. Of course, we believe our calculations are accurate according to the current knowledge of the long-term motion of the celestial pole and Vega's currently measured proper motion, which is quoted in the SIMBAD database as having small uncertainty. It is always possible, however, that new information might be measured or discovered about the long-term apparent motion of a star.

‡71. In addition, if we were to consider only the part of the passage that descends through the bedrock, which is about

two-thirds of its length, the Vega-shining-down time would be extended by a couple of hundred years.

§72. In *The Origin Map,* Brophy estimates around 11,770 BCE for the match of Orion's belt and the pyramids, and in *The Egypt Code,* Bauval estimates 11,450 BCE. For a number of reasons, these matching dates should be considered estimates to within a few hundred years. For example, some date variation may arise from the choice between matching the line connecting the end stars (to the end pyramids) or matching the first two stars (to the first two pyramids). In addition, there may be some differences as to whether more recent, proper motion measurements were used for the stars and slight differences in approximations in the methods of celestial pole motion calculations. We do not, therefore, view the Orion's-belt-to-pyramids layout match as a highly precise date, though it definitely occurred within this era. The subterranean passage star shafts, however, offer more precise dating.

*73. Dimmer stars cannot be viewed when they are just barely above the horizon, because of atmospheric extinction. As they rise farther above the horizon, often to a degree or more altitude, the light from the star passes through less of Earth's atmosphere and obscuring dust, and the star becomes visible to the eye.

*74. The ancient names of its two sister structures were less poetic and seemingly less informative: Great is Khafre and Menkaure is Divine.

*75. As we have said, there is a significant spread of half a degree or so in the viewing angle of these subterranean passages, due to their 1.2 meter- (3.9 feet) shaft heights, so the possible association of the precessional culmination of Vega does not depend on the fact that it seems to have hit directly the middle of the viewing angle—that amount of precision could be happenstance.

*76. If we wanted to interpret the half-degree difference as precise to Vega, the central alignment would be about three hundred years later than for Khufu's subterranean passage. Alternatively, they may be considered as less precise versions of the same alignment to Vega.

†77. Djoser's and Imhotep's step pyramid complex at Saqqara was the first major pyramid complex construction, but it contained a step pyramid, not a true pyramid.

*78. Recent discoveries in Turkey, at a site called Gobekli Tepi, involve finely carved megalithic pillars and rings that have been firmly radiocarbon dated to the tenth millennium BCE. In a submission to an academic journal, we mentioned Gobekli Tepi as evidence that man was making fine megalithic constructions much earlier than the Late Neolithic to support our contention that some of the megalithic constructions at Nabta Playa may also predate the orthodox view of the Late Neolithic. The anonymous academic referee objected to our reference on the grounds that "authors' remarks on megalithic pillars found in Turkey are totally irrelevant. I reject any idea of possible contacts between Turkish site and Nabta assuming both sites were independently constructed." In our paper, we neither claimed nor disclaimed contact between Nabta and Gobekli Tepi. We did claim that recent evidence pushed much farther back in time the dates of ceremonial megalithic architecture at other sites and that this evidence should lessen the resistance to consider new evidence, which might similarly push back dates at Nabta.

*79. Orion's belt also culminated south during the same epoch, ca. 10,650 BCE.

†80. In *The Origin Map* it is shown to be 10,909 BCE.

*81. Ingham calculated four cycles: 1,458 years ending in 2769 BCE; 1,456 years ending in 1313 BCE; 1,453 years ending in 141 CE; and 1,450 years ending in 1591 CE.

*82. One problem: we don't know how the ancient Egyptians defined the heliacal rising of Sirius. All we know is that they considered it very important and called it the reappearance of Sirius or, simply, the rising of Sirius.

*83. There are two types of uncertainties regarding the serdab view angle. First is the spread of angles due to the aperture of the peepholes, and second is any remaining uncertainty as to the basic measures of its angles. Mark Lehner lists the altitude of the serdab as 13 degrees without reference, and the layout survey gives an azimuth of about 4.5 degrees for the whole complex. We then used a protractor and plumb bob at the site to estimate about 16 degrees for the serdab box. In any case, the serdab gazes generally in the correct region of the sky to view Alkaid simultaneous with Sirius rising heliacally on the day of summer solstice.

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